1859 FIFTY-EIGHTH YEAR 1917

CHEMICAL LIBRARY
APR 23 1917
UNIV. OF MICH.
LIBRARY

AMERICAN
GAS ENGINEERING JOURNAL
FORMERLY
AMERICAN GAS LIGHT JOURNAL

VOL. CVI., NO. 17
WHOLE No. 3085

NEW YORK, SATURDAY, APRIL 21, 1917

Subscription $3 per year
$4 Canada $5 Foreign

Tangible Proof

Facts— For some months past requests have been coming into the office for recent back numbers of the AMERICAN GAS ENGINEERING JOURNAL. Every letter came from an individual whose company was a subscriber.

Cause— The educational and business value of the articles appearing in the AMERICAN GAS ENGINEERING JOURNAL was the primary cause for the requests. The secondary cause was that these individuals had been reading the company's copy and realized the value of having their *own* copy to clip and save as they liked.

Effect— With this deluge of orders for extra copies there could be only one effect—Disappointment—Only an explanation where the request was for a copy.

Remedy— Have the JOURNAL sent to your Home every week. The cost, $3.00 per year, is too small to hold you back when balanced against the gain.

AMERICAN GAS LIGHT JOURNAL, INC.

The above suggestion appeared in the March 24th issue. Since then we have received orders from individuals for over 100 back numbers, which we have been unable to fill. Get your subscriptions in now so that you will not miss any of the good things appearing in every issue of the JOURNAL.

INDEX TO CONTENTS, PAGE 396 ADVERTISERS' INDEX, PAGE 18

TRENCHING *and* BACK FILLING

THE BIG SWIFT WAY

Cut shows Model 24, weight 7½ tons. 12", 15", 18", 24", wide, maximum depth 10'.

PARSONS

What Other Machines Have These Features?

Reverse traction and digging action.

Direct drive to digger shaft, eliminating extra friction. Case-hardened bushed roller excavator and traction drive chain. Will never wear out. Easy steering arrangement, three-point suspension.

Conveyor mounted on rollers; easy to move backward or forward to avoid obstructions.

Digger plows designed exactly like steam shovel dipper teeth.

Positive cleaning arrangement—can dig in sticky soils.

Boom very rigid and heavy—can't sag.

Machines very light and rigid, made possible by careful re-design and introduction of special alloyed metals. Extra large shaftings and gears giving strength equal to heavier machines.

All machines have very short wheel base, making them easy to handle.

Cut shows No. 10 Parsons Back Filler.

Parsons Back Fillers

Boom of pipe construction.

Can be collapsed to lengths that suit.

Maximum boom length 30 feet.

These machines can be used on any trench excavation job whether a trench excavator is practical or not.

Wherever operated they have always opened the way to other sales. Are big labor-savers.

We cheerfully answer inquiries.

THE PARSONS COMPANY

Home Office and Works
616 SIXTH STREET
NEWTON, IOWA

Eastern Sales Office
18 WEST 34th STREET
NEW YORK CITY

AMERICAN
GAS ENGINEERING JOURNAL

FORMERLY THE AMERICAN GAS LIGHT JOURNAL

Vol. CVI, No. 17 NEW YORK, APRIL 21, 1917 Whole No. 3085

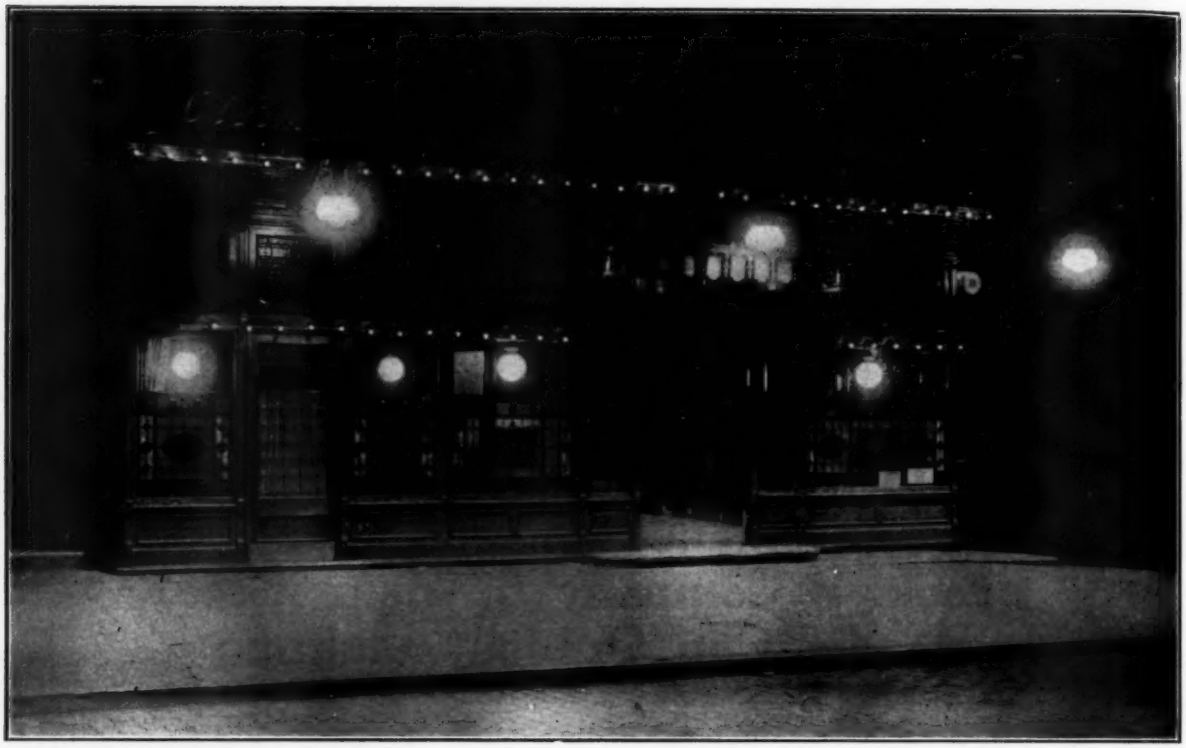
Attention to Artistic Details in Hanging Lamps and to Convenience of Consumer Enables Brooklyn Company to Make Great Headway in Outdoor Lighting

Selling Lamps on Rental Plan Keeps Down Stock of Used Lamps—Distant Control Feature Does Away With Frequently Advanced Argument for Not Using Gas for Store-Front Lighting — Thirty Different Styles of Brackets Made Up from One Inch Pipe and Fittings

The selling of gas for lighting purposes is a problem that requires the careful attention of both the salesman and the engineer. Unless both work together the best results can never be obtained. No matter how good the work one may do, if he is not backed up by the other the final result is sure to be failure.

In the case of outdoor lighting the engineering features of the problem are proper installation and maintenance. The best stores will no longer allow a lamp to be hung in front of their places of business on the end of a crooked piece or rusty pipe. The supporting bracket must be made attractive and the lamp hung

OUTDOOR LAMPS PROPERLY INSTALLED AN ORNAMENT TO PLACE OF BUSINESS BY DAY AS WELL AS BY NIGHT.



NO ILLUMINATING AGENCY COULD LIGHT MORE EFFICIENTLY OR PRESENT A MORE PLEASING ASPECT THAN THESE GAS LAMPS AT NIGHT

at the proper distance from the store front and the right height above the street or there is bound to be dissatisfaction. Just as important, however, as a proper installation is proper maintenance. It makes little difference how satisfactory the lamp may be the first week, if from that time on it is allowed to collect dust and get out of adjustment or broken mantles are not replaced with new ones the lamp is sure to be ordered out.

The marked success that the Brooklyn Union Gas Company has had during the past few years indicates that it has solved these problems in a very satisfactory manner. T. M. Ambler, the commercial manager of the company, is an old merchandising man, and when he took charge of the commercial work he was in a position to see the consumer's side as well as the gas company's side. Accordingly, he started in to work out a system which would prove satisfactory to both.

Keeping Down the Stock of Old Lamps.

The most serious feature appeared to be that of the old lamps in the stock rooms, because these old lamps not only increased the cost of selling and maintaining, but also very greatly limited the amount of business that could be done. They gave the public such a poor opinion of gas lighting and absorbed so much of the time and energy of the commercial department that there was very little opportunity to do very much aggressive work with new lamps. It was therefore decided to sell all of these old lamps.

Selling the old lamps, however, would not prevent a collection of another lot of old lamps unless the old method of renting was replaced by some method of selling all the new lamps. After a very thorough study of the situation the following plan was decided upon: Five-mantle inverted outdoor arc lamps were rented at the rate of $1.25 per month, including maintenance, with the agreement that after the rental has been paid for twenty-four consecutive months the lamps become the property of the consumer. The three-mantle outdoor inverted gas arc is placed upon the same basis except that the monthly rental is $1 per month instead of $1.25. The single-mantle lamp is $1 per month for eighteen months. At the end of the rental period the consumer may choose between maintaining the lamps himself, contracting with the gas company to maintain them, or buy a new style of lamps.

In practice this method has worked out very satistorily. Comparatively few remove their lamps before they become their property. This greatly reduces the percentage of bring-ins. Since installations are made with new lamps, it is easier to make these installations look neat and attractive than would be the case if it was necessary to use old lamps. This also means that there are no old lamps collecting in the stock room and that the company is at liberty to purchase the latest style of gas lamps on the market.

This results in lowering the cost of maintenance and the cost of securing new business, and increases the general satisfaction of the consumers. The words "new business" as used here mean the net gain of lamps on the mains actually consuming gas. In other words, the difference between the number of lamps installed and the number brought into the storeroom.

With many gas companies the weakest point in outdoor gas lighting is the method of installing. It is very simple to make up very attractive brackets from pieces of 1 in. pipe and standard fittings, yet there are far too

many gas companies which have not adopted this style of bracket. The Brooklyn Union Gas Company has made up as many as thirty different styles of brackets by simply using 1 in. pipe, tees, Ys, elbows, etc., with acorn plugs and caps. Drips of ample size are provided on each bracket, and the lamps are hung on drip cups.

DISTANT CONTROL IN GENERAL USE.

Since there are so many storekeepers having serious objections to lighting the lamps each night with a long pole, and since there are many locations, such as sign lighting, where it would be very inconvenient, to say the least, to light the lamps nightly with a pole, the company experimented with several different forms of remote control. The method finally adopted as standard, and which is now used on all outdoor installations, is a magnetic valve to turn on and off the supply of gas to the mantles and a pilot light to light the lamp. This method has not only proved very satisfactory in practice, but has resulted in a great deal more popular use of outdoor gas lighting than would have been possible with the old style installations.

Ever since this system has been in operation it has been possible to make the gas lighting department pay its way.

All salesmen are either paid a straight commission or their remuneration is based on their individual cost of securing new lamp business.

The gas lamp shop department is run on a modern efficiency basis. Fitters and trimmers are rated in accordance with their individual efficiencies. Nothing is left to guesswork or favorable impressions made by pleasing personalities. Everything is recorded and reduced to cold, accurate percentages. The more efficient a man is the greater is his remuneration. The less efficient he is the less his remuneration until the time comes when it becomes necessary for him to leave the employ of the company.

The trimmers and fitters are supervised by inspectors. The main duty of these men is to increase the efficiency of the men and not to discover their mistakes. They therefore always endeavor to show the men how the work can be done better and quicker.

The best results can be secured only where the men have confidence in the organization they are connected with and are constantly looking forward to greater and immediate rewards for better services. Men do better work when led and encouraged than when pushed and threatened.

The policy throughout the Brooklyn Union Gas Company commercial department, both in the shop department and in the sales department, is to lead and encourage. The men appear happy and contented, and as a result the consumers are satisfied with the service rendered.

Body Should Be Exercised in Proportion to Mind

I for one believe most firmly that sound bodies, if not actually necessary, at least tell for sound minds and sound judgment, and so tend for longer and more efficient years of service. The more intensively a boy or man works with his head the more he needs properly selected exercise for his body, and as much of this as possible in the open.—*Dr. A. C. Humphreys in Address at Stevens Institute of Technology.*

Benzol More Valuable than Gasoline as Motor Fuel when Used Straight and Its Effectiveness is Increased when Mixed with Latter

Benzol Also Miscible with Alcohol—Looked Upon by Many as the Ultimate Fuel, and Assists in Making a Most Efficient Fuel—Mixture Will Carry Quite a High Proportion of Gasoline

The fact that experiments recently conducted by a large oil company on its trucks and passenger automobiles proved not only is benzol more valuable than gasoline as a motor fuel when used straight, but its effective value is increased by being mixed with gasoline, was pointed out by C. J. Ramsburg and F. W. Sperr, Jr., vice-president and chemist, respectively, of the H. Koppers Company, in a paper published in a recent issue of the *Journal* of the Franklin Institute.

While these experiments are not complete, nevertheless they indicate that a mixture of equal parts of gasoline and benzol gives a value over 16 per cent. greater than that of straight gasoline, which shows 32 per cent. increased value for the benzol half.

In 1917 there will be produced in this country over 1,000,000,000 gal. of gasoline, so, while the value of benzol is stabilized, for this reason it cannot be a very great factor in the motor fuel situation. Every means should be taken not only to secure additional quantities from a standpoint of preparedness, but from a standpoint of motor fuel supply.

In connection with the value of benzol as a motor fuel there is an interesting fact which may in the future have a very marked influence.

Alcohol is in many quarters looked upon as the ultimate fuel, but it cannot be employed except with less efficiency and with greater difficulties, due to its high hydrogen content. Commercial alcohol and gasoline are not miscible. Alcohol and benzol are miscible and make a most efficient fuel, and, further, after the addition of benzol to alcohol the mixture will carry quite a high proportion of gasoline. The future may see benzol as the tie between gasoline and alcohol, permitting a piecing out of the gasoline supply and an introduction of alcohol as a commercial motor fuel.

Removing Rust from Badly Pitted Steel

A method of removing rust from corroded and pitted iron plates, claimed to be easy, cheap, and effective, has been evolved from experiments carried out by the Consolidated Gold Fields Laboratory, South Africa, states a recent number of the *Iron Age*. It consists in applying to the surface of the iron a mixture of 2 parts of finely crushed sodium bisulphate and 1 part common salt. This mixture is prepared, then moistened just sufficiently to be cohesive, and applied to the plate. The moist mixture can be left till the plate is clean, but the action is more rapid if the mixture is scraped off every two or three hours and the iron scrubbed thoroughly with a wire brush and water. The treatment is repeated till the plate is clean. Usually 24 hours is sufficient for a badly corroded plate. When the plate is thoroughly clean it is well washed with an alkaline solution, and dried quickly. A coating of paraffin oil is at once applied to protect the surface against oxidation. The metal is then ready for the paint or other protective covering. The method is stated to be more effective than hammering, chiselling, the use of wire brushes or even a sand blast.

Gives Results Obtained with 23 Kinds of Gas Coals in Seven Types of Carbonization Plants

Edward H. Taylor Also Presents Useful Findings in Regard to Plant Operation—Need of More Thorough Instruction to Works Foremen

In a paper presented at the recent annual meeting of the Illinois Gas Association Edward H. Taylor, consulting engineer, of Chicago, described his finding in using 23 different kinds of gas coals in seven different types of carbonization plants in 20 coal gas works as follows:

It must be borne in mind that the yield from the different kinds of coal is recorded as having been obtained in a certain type of retort at a given temperature. The results undoubtedly would have been different had the coal been used under different conditions and subjected to a different degree of heat.

The variation in bench fuel results obtained in the different works where I made tests was due to a considerable extent to local conditions and the methods of operation. The following gives the maximum and minimum results and were recorded on the basis of tons of coal carbonized:

Type.	Fuel.	Amount used per ton carbonized.
Half depth D 6's	Coke	305—625 lb.
Half depth D 6's	Coal	400—650 lb.
Full depth D 9's	Coke	290—400 lb.
Full depth D 9's	Coal	320—375 lb.
Imp. Eq. Co. D 6's	Coke	280—380 lb.
Imp. Eq. Co. D 9's	Coke	275—340 lb.
Imp. Eq. Co. D 9's	Coal	320—370 lb.
Incline D 6's	Coke	275—325 lb.
Inc. Slots	Coke	260—320 lb.
Inc. Ovens	Coke	330—400 lb.

The following data were taken on a bench of half depth sixes at a time when 305 lb. of bench fuel (coke) was being used per ton of coal carbonized. The retort temperature given is an average of the six retorts in the bench. The draft readings are measured in inches of water; the stack draft is measured at the outlet of the recuperator; the stack temperature was taken at the same point. The sample of gas taken for analysis was drawn from the outlet of the combustion chamber, just before the gas passed into the recuperator. The sample of generator gas was taken from the center nostril.

		DRAFT				
Retort Temp.	Primary	Secondary	Stack	Gas Anal.	Stack Temp.
1700 deg. F.	R	0.0300	0.0650	17.4 CO_2	680 deg. F.
	0.0100				
	L	0.0275	0.0525	13.2 CO_2	700 deg. F.

Analysis of Generator Gas	
CO_2	8.8
O	0.2
CO	22.6
H	4.0
N	64.4
	100.0

The following data were taken on a bench of half depth sixes of the same type and construction as the preceding when 380 lb. of bench fuel (coke) was being used per ton of coal carbonized.

1675 deg. F.	R 0.0300	0.0400	0.0100	18.4 CO_2	1090 deg. F.
	L 0.0275	0.0375	0.0700	17.0 CO_2	950 deg. F.

The analysis of generator gas was practically the same.

Name of Coal	State in which mined	Size of coal as charged	Mois.	Analysis of coal as charged Ash	Vol.	F. C.	Total	Sulphur in Dry Coal	Tons carbonized per day	Duration of test	Kind of Retort	Temp of Retort	Yield of cur. gas per lb. of coal charged	Av. Btu. per cu. ft. of cur. gas made
1 Boston	Pa.	3-4 in. lump	6.1	7.3	34.6	51.8	100	.62	38	72 hrs.	D 9's	1700°F	4.73	603
2 Kinkora	Pa	"	7.	7.8	33.5	52.1	100	.71	18	144 hrs.	D 6's	1750°F	4.9	585
3 Thompson	Va.	"	7.3	7.8	34.1	50.8	100	.82	30	144 hrs.	D 6's	1750°F	4.9	606
4 Westmoreland	Pa.	"	5.7	6.7	35.5	52.1	100	.58	19	72 hrs.	D 6's	1750°F	5.06	595
5 Fourth Pool	Pa.	"	5.9	5.2	36.2	52.7	100	.49	19	72 hrs.	Im Eq Co	1650°F	4.94	615
6 King	Pa.	"	8	8.2	33.6	50.2	100	.69	38	144 hrs.	D 9's	1800°F	4.83	570
7 Coston	Ky.	2 x 5	5.1	5.7	36.2	53.	100	.53	50	72 hrs.	Inc.6's	1850°F	5.35	585
8 Coston	Ky.	"	5.2	6.1	34.6	54.1	100	.58	20	24 hrs.	Inc. 6's	1850°F	4.9	580
9 Elkhorn	Ky.	3-4 in. lump	4.9	5.6	36.6	52.9	100	.51	15	144 hrs.	D 6's	1800°F	5.53	590
10 Hood	Ky.	2 x 5	6.3	6.6	33.2	53.9	100	.58	15	24 hrs.	Inc. 6's	1850°F	4.87	575
11 Kayo	Ky.	"	6.1	6.3	33.1	54.5	100	.59	15	24 hrs.	Inc. 6's	1850°F	4.96	575
12 Benham	Ky.	"	5	5.5	35.4	54.1	100	.54	42	72 hrs.	Im. E.Co.	1800°F	5.02	585
13 Caney Fork	Ky.	2 in. lump	8.6	11.	32.3	48.1	100	1.63	15	144 hrs.	D 6's	1775°F	4.82	598
14 Looney Creek	Ky.	3 x 5	6.1	7.2	34.6	52.1	100	.58	15	24 hrs.	Inc.6's	1850°F	5.1	575
15 Middlesboro	Ky.	"	5.9	8.9	33.5	51.7	100	.67	15	24 hrs.	Inc. 6's	1850°F	4.85	575
16 Middlefort	Ky.	Nut and slack	6.3	9.4	34.9	49.4	100	.62	60	144 hrs.	Inc. oven	1875°F	4.9	594
17 Wallins	Ky.	2 x 5	5.3	5.5	36.4	52.8	100	.53	50	144 hrs.	D 6's	1800°F	5.47	592
18 Wyatt	W.Va.	2 x 5	5.8	8.2	32.1	53.9	100	.61	60	144 hrs.	Inc.oven	1975°F	4.91	598
19 Hoda	W.Va.	eggs.	5.1	5.9	33.8	55.2	100	.68	38	144 hrs.	D 6's	1850°F	5.01	588
20 Island Creek	W.Va.	3-4 in lump	6.1	7.9	32.1	53.9	100	.98	60	144 hrs.	Inc. oven	1900°F	4.87	597
21 Stonega	W.Va.	"	5.5	6.1	34.2	54.2	100	.56	40	72 hours	Ellperbre thru	1900°F	5.47	609
22 Wajestic	Ill.	3 x 6	7.9	9.1	33.5	49.5	100	.86	15	72 hours	D 6's	1800°F	4.5	550
23 Freeman	Ill.	6 in. lump	7.1	7.9	32.9	52.1	100	1.16	60	48 hrs.	Inc Oven	1900°F	4.5	550

	Thermal ft. per lb. of coal charged	Hydrogen Sulphide per 100 cu.ft. water. gas. Outlet of Exhauster	Outlet of Scrubber	Total sulphur in grains per 100 cu.ft. of gas	Ammonia yield in lbs. per ton of coal as charged	Tar Yield in gals per ton of coal as charged	Coke Yield per ton of coal as charged	3-4 inch breeze per ton of coke discharged	Quality of Coke
1	2882	360	275	10.22	4.2	12.5	67%	10%	Hard large size
2	2946	320	280	9.92		12.6	64%	10%	"
3	2959	420	340	17.21		12.9	64%	9%	"
4	3015	310	230	14.93			64%	11%	Hard medium size
5	3050	290	210	11.20		12.9	67%	11%	"
6	2763	340	230	14.38	3.6	11.9	67%	12%	"
7	3129	320	230	9.2	5.38	12.5	64%	15½%	Medium size
8	2942						65%	17%	"
9	3262					8.8	68%	19%	"
10	2900	360	270	9.86	5.2		67%	18%	"
11	2852						68%	17½%	"
12	3042	360	290	10.05	5.1	11.6	65%	16%	"
13	2962	880	620	30.64	3.7	12.4	65%	21%	Poor quality, soft
14	2932						68%	18%	Medium size
15	2786						65%	19½%	Medium size
16	2910	340	250	11.22			66%		"
17	3238	270	210	8.4	5.38	12.5	68%	16%	"
18	2936	380	240	9.19	4.6	13.5	69%	11%	Hard large size
19	2944	270	200	10.11			66%		Hard large size
20	2937	330	240	14.38					Medium size
21	3221	330	220	8.37	5.5	11.8	64%	12%	Large hard
22	3475	290	210	7.93	5.2	12.	67%	14%	Medium size fair quality
23	2365	340	260	19.84					

The following data were taken on a bench of half depth sixes of the same type and construction as the preceding when 475 lb. of bench fuel (coke) was being used per ton of coal carbonized.

1750 deg. F.	R 0.0100	0.0725	0.1175	17.6 CO_2	1300	deg. F.
	L 0.0150	0.0550	0.1275	16.0 CO_2	1045	deg. F.

Analysis of generator gas was practically the same.

It is evident from the above that considerable time and study can be well spent upon the subject of design and operation of coal gas benches.

The following data were obtained on a bench of inclined sixes using 275 lb. of coke per ton of coal carbonized. The bench was equipped with a superheated steam air blower.

Side.	R.		L.	
Primary Draft	1.0500			
Front Secondary	0.0800		0.0825	
Back Secondary	0.0500		0.0425	
Front Stack	0.1020		0.1100	
CO_2	17.6	per cent.	16.6	per cent.
Back Stack	0.1000		0.1075	
CO_2	18	per cent.	17	per cent.
Temp. Back Stack.....	1035	deg. F.	945	deg. F.
Retort Temp.	1850	deg. F.		

The analysis of the generator gas was practically the same.

The following data were taken on a bench of inclined slot fours using 260 lb. of coke per ton of coal carbonized. The bench was equipped with a superheated steam air blower.

Side.	R.	L.
Primary	0.1800	
Front Secondary	0.0325	0.0425
Back Secondary	0.0400	0.0450
Stack	0.0925	0.0975
Gas Analysis		
Back Stack	16.5 per cent.	15.8 per cent.
Main Stack	0.2000	

In my observations I have found that benches equipped with superheated steam primary air blowers were usually free from clinkers, provided a sufficient amount of superheated steam was used. I found that the amount of steam necessary varied from 0.75 to 1.5 lb. per pound of fuel consumed according to its quality.

In a number of gas works complaints were made regarding clinkers where superheated steam air blowers were installed, but upon investigation it was found that an insufficient amount of steam was being used. This was due to the fact that the steam had been superheated to approximately 600 deg. Fahr. and that the calculation on the flow of steam to the nozzle in air blower had been based upon saturated steam.

In one case, 200 lb. of generator fuel was being consumed per hour, and owing to the character of fuel, required a like amount of steam. The steam was superheated to such a degree that only 40 lb. of steam per hour passed through the blower. Considerable clinker trouble resulted.

The temperatures in the above observations were either taken with a Wanner Optical Pyrometer or else calibrated against it. They are therefore reasonably accurate. The draft readings were taken with a differential draft gauge calibrated to 1-400 of an inch. The gas analyses were made on a small portable CO_2 analyzer and a portable complete gas analyzer.

Apparatus Operation

In many of the works I have found that much of the apparatus suffered from lack of attention. The exhausters and governors were generally kept in good condition. Frequently the condensers were not supplied with a sufficient amount of water to reduce the temperature of the gas to a desirable point.

The P. and A. apparatus were frequently found bypassed on account of back pressure. This was an unfortunate condition, as much of the naphthaline made in the retorts is taken out at this point, provided the temperature of the gas is kept at about 90 deg. Fahr. In many works the washer receives but slight

attention unless it causes trouble on account of back pressure and has to be by-passed. Then it is cleaned.

I found that a washer does the best work when blown down twice in 24 hours, and when the seal is kept at from 3½ to 4½ in. Attention to this piece of apparatus frequently increased the ammonia yield.

In many of the works, the scrubbing apparatus was neglected. Where coke was used in the scrubbers I found that it had not been changed for some considerable length of time and was of little service because it was clogged to such an extent that the water would pass through rabbit holes and seldom come in contact with the gas. I found many scrubbers, filled with grids, in the same condition.

Need of Instruction of Foremen

In addition to this trouble, there was considerable uncertainty among works' foremen regarding the amount of water which should be used in scrubbing and the method by which it should be supplied. I found that the most satisfactory results came from using a dump-box by means of which the water could be measured easily.

The amount of water required I found to be about 2½ gal. per thousand cubic feet of gas. Where larger amounts of water were used, I found the crude liquor going to the ammonia well too weak. In some cases it did not exceed 0.05 in strength. In some cases, where an excessive amount of water was used, it appeared to reduce the B.t.u. in the purified gas.

In many works the ammonia still was neglected because it was old style. In many cases the expenditure of but a few dollars would have put the same in good operating condition. In some instances, the old stills were equipped with thermo regulators, gravity feed, liquor and lime tanks. In these cases the results were most satisfactory.

In works where stills of later design were in use and given proper attention, the results, as a rule were good. However, in one case, where the ammonia yield was low I found the temperature of the crude liquor well too high, and much ammonia was lost at this point.

One superintendent complained that his ammonia yield had been off for the previous thirty days and that he was unable to detect the cause. He had changed coal about the time the ammonia yield began to drop, but was informed by the coal company that the coal was the same quality as that he had been using previously. The gas yield and B.t.u. remained the same.

The ammonia yield, however, was less. We located the trouble by making a test of the foul gas at the hydraulic main with a Tutwiler, using a solution of H_2SO_4 and Sodium Alizarine Sulphinate as an indicator. In this manner the grains of free ammonia in the foul gas were determined. By previous analysis the free and fixed ammonia had been determined in the laboratory from samples taken from the crude liquor well. By adding the fixed ammonia to the amount of ammonia that we had in the foul gas and making a slight allowance for losses in passing through the works, we found that he was getting all the ammonia that was possible to reclaim from gas made from the coal he was using at that time.

This is a simple test to make and I believe is quite valuable, although I found it used but seldom.

Naphthaline Results

Nearly every works I visited was equipped with apparatus to fight naphthaline troubles, and usually there was considerable money spent in doing this. However, seldom if ever, were naphthaline tests made to determine when the objectionable naphthaline was being made. The test is simple, and in my opinion, a most advisable one to make.

The test devised by Smith and Coleman is very satisfactory and I have used it in my work. The excuse which was made at a number of plants for not making these tests was that they did not have a wet test meter which could be used for the purpose. Nearly every plant in Illinois is equipped with a calorimeter. The meter belonging to the calorimeter can be used at night for running the naphthaline tests and thereby save the expense of purchasing an additional wet meter.

I have found that most of the naphthaline troubles come from a combination of high retort heats and small charges. The following are the results of some of the naphthaline tests which I have made:

Style Retort	Temp. Deg. Fahr.	Amt. char. lbs.	Temp. Pur. Gas Deg. Fahr.	Grains per 100 c. ft.
D	1900	325	85	48.6
D	1850	450	80	11.2
Inc. oven	1950	5000	84	9.5
Inc. D	1850	1100	82	7.2

My comments on apparatus operation may appear to some to contain a note of censure. Every time a piece of apparatus is by-passed something is going to waste, otherwise the apparatus should not have been installed in the first place.

Do not let your works foreman by-pass apparatus without your knowing why he did it and see that it is put back into service immediately. This as a rule will save you money.

Oxide Results

The subject of purification is too deep a one for a person of my limited experience to discuss. I have heard many superintendents and chemists express their opinions and no two seem to agree. Most of the results which I have seen were so at variance that I have been skeptical about them.

One superintendent told me that it was impossible to purify more than 58,000 cu. ft. of gas with one bushel of oxide. Another superintendent told me very positively that he had purified over 500,000 cu. ft. of gas with one bushel of oxide. I hope some day the subject will be standardized so that it can be discussed intelligently.

I find some works using oxide with as little as 10 lb. of iron per bushel, while another works uses 35 lb. of iron per bushel. One works will send gas to its purifiers containing 200 grains of hydrogen sulphide per 100 cu. ft. of gas, while another will send the gas to the purifiers containing 400 grains of hydrogen sulphide. Water gas frequently goes as low as 70 grains of hydrogen sulphide per 100 cu. ft. of gas. So it is almost impossible to tell how much work can be expetced from one bushel of oxide during its life.

Oxide Ruined by Tar

I have found very few plants equipped with the necessary apparatus with which to test oxide. I use a soxhlette extractor and determine the amount of tar and free sulphur contained in the oxide, after it has been revived and is ready to again be placed in the purifying boxes.

The following are some of the results which I have obtained:

Kind of Oxide	Time of service	No. times changed	Per cent. free sul.	Per cent. tar
Conley	4 years	0	43.41	5.63
Conley	1 year	2	13.63	17.67
Conley	2 years	5	26	6.48
Home made	1 year	3	13.82	38.36
Lavino	1 year	2	13.75	3.49
Conley	3 mos.	0	2.67	1.37

From the above results it is apparent that much oxide is ruined by tar and if superintendents made the simple test which I use, they would know at once that it is tar which causes the trouble instead of condemning the oxide they are using and changing possibly to other oxide which is no better.

In the first of the above tests the oxide was allowed to remain in the box untouched for four years; the plant was equipped with four large purifiers, all of which were put in service at the time the plant was started, and all the boxes were filled with new purifying material. The boxes were built for a capacity of 500,000 cu. ft. per day but never more than 150,000 cu. ft. per day had been put through them. The only chance the oxide had for revivification came from 2 per cent. of air which was sent through the boxes with the unpurified gas.

Assuming that each box had performed an equal proportion of the purifying done, the boxes having been reversed once a week, I found that each bushel of oxide had purified 58,700 cu. ft. of gas. The oxide when removed from the box, after revivification, contained so much sulphur that it was decided not to use it again. The same coal had been used at this plant during the four years of its existence, and the gas at the outlet of the scrubber contained 220 grains of hydrogen sulphide, and the total sulphur in the purified gas showed 9.19 grains.

From the best information I can obtain on the subject, it would appear that this oxide had performed about 90 per cent. of the theoretical work it was possible for it to do. In the last of the above tests, the oxide was removed from the box prematurely, which brings up quite an important point.

The boxes had been reversed and this particular box did not seem to be doing any particular good. After the same had been refilled it did very little better, the whole trouble being that one of the connecting valves did not close tightly. I have found it of considerable value to make Tutwiler tests on each box separately once a week. If the boxes are reversed oftener, the tests should be made more frequently. This will immediately show if any valve is leaking.

A number of superintendents whom I have induced to use this method of checking their purification, tell me it has saved considerable time and expense.

I have weighed a number of samples of spent oxide and find that the same vary from 45 to 89 lb. per bushel. The sample weighing 89 lb. contained 29 per cent. of sulphur. I do not know what this oxide weighed originally. I have found that commercial oxide on the market to-day weighs from 31 to 35 lb. to the bushel and contains from 18 to 21 lb. of iron.

In the past year several new purifying materials have been placed on the market, but I have been unable to secure sufficient data regarding them to make it of value at this time.

Laboratory Equipment

I have frequently been asked what I considered necessary in the shape of laboratory equipment for a gas works of average size and what would be its cost. I recently purchased a complete outfit including a calorimeter, for a gas company. It cost $725 F. O. B. Chicago. This included a sufficient amount of chemicals to operate the laboratory for several months.

The following is a list of the equipment:

Calorimeter.
Tutwiler.
Portable Gas Analyzer for CO_2.
Test Meter.
Referee's Apparatus for Total Sulphur.
Draft Gauge calibrated in 100's.
Draft Gauge calibrated in 400's.
Soxhlette.
Sensitive Balance.
Condenser.
Pyrometer and Thermal Couple.
Two Burettes.
Bunsen Burners.
Porcelain Crucibles.
Beakers.
Flasks.
Re-agent Bottles.
Re-agent Jars.
Water Still.
Water-cooled Sampling Tube.
Rubber Hose.
Glass Tubing.

If water gas as well as coal gas is made at a works, a complete gas analyzer which would cost about $35, should be added.

Mixing Gas Coals

I have been requested by several members of the association to give some data regarding the results obtained from mixing a low sulphur Illinois coal with some standard gas coal. I have tried this experiment in a number of places, and found that wherever Illinois coal could be delivered on a low enough freight rate to make the difference in price, F. O. B. works at least $1 lower than standard gas coal, it was advisable to use it.

The following results were obtained in a plant during the past year and are illustrative of the general results. A Kentucky gas coal was used five days straight. The B.t.u. on the make as well as the send-out was taken once an hour for 14 hours per day; then ⅓ Illinois coal was used in conjunction with the Kentucky coal, the coal being charged in the lower row of retorts and the resultant coke being used for generator fuel; the excess remaining was placed on the stock pile with the coke made from the Kentucky coal and did not in any way interfere with the sale of the coke. Coke from this stock pile was used for domestic purposes in the town where the works was located and also shipped in carload lots.

Day	Kind coal	Av. B.t.u. Hold.	Av. B.t.u. Made	Yield	H_2S Scrubber	Total Sulp.
1	Kentucky	605	591	5.26	350	8.31
2	Kentucky	595	615	5.28	330	8.86
3	Kentucky	608	610	5.18	390	7.92
4	Kentucky	612	590	5.10	340	8.12
5	Kentucky	592	592	5.32	360	8.40
6	Ken. 1/3 & Ill. 2/3	581	587	5.29	390	11.2
7	Ken. 1/3 & Ill. 2/3	591	595	5.20	340	10.9
8	Ken. 1/3 & Ill. 2/3	598	602	5.14	330	10.2
9	Ken. 1/3 & Ill. 2/3	606	610	5.02	320	8.9
10	Ken. 1/3 & Ill. 2/3	594	583	5.25	340	9.6

The only change made in the operation of the retorts during this test was that the heats were increased about 100 deg. Fahr. The seal was reduced from ½ to ¼ in.

At the works where the above test was conducted the price of Illinois coal was $1.50 less than the Kentucky gas coal F. O. B. works. The cost of gas in the holder was reduced 4 cents per thousand by using the mixture of Kentucky gas ⅔ and Illinois gas ⅓.

If I had written this paper prior to Oct. 1, 1916, when this present distressing car shortage began, I should have stated that I did not deem it advisable to use more than ⅓ Illinois coal in these mixtures. However, during the past few months a number of plants have used Illinois coal straight for several days at a time to avoid having a shut down and have got by in fairly good shape, one plant reporting a yield of 4.4 cu. ft. with a B.t.u. of 572 in the send-out. The coke from the Illinois coal was used in a water gas set, where fairly good results were obtained.

Two plants report considerable trouble with some Illinois coal from Franklin County. Although it was low in sulphur there was apparently a deposit of salt which came out of the gas and has a tendency to stop up valves. In one plant I saw a piece about four inches square and over an inch thick taken from the inlet valve of the collecting main governor.

I had never heard of this trouble before, although I had experimented considerably with Illinois coals.

The Bureau of Mines now has a representative in Illinois studying gas problems.

Describes Rochester Company's Methods of Testing Meters

Vincent Hoddick Furnishes Suggestions that may With Advantage be Adopted by Other Companies in Performing this Task

Vincent Hoddick in a recent number of *Gas and Electric News*, issued by the Rochester Railway & Light Company, gives the following description of the practices of his company in testing meters.

After a meter is removed it is of vital importance that it should be carefully protected so that it can be tested as nearly as possible under the same conditions that existed at the time the meter was in service. Upon disconnecting a meter the fitter immediately caps the tube screws (where the piping connections are made) with tin caps which are provided for this purpose. The meter is handled very carefully and is kept in an upright position until it is returned to the meter shop where it is placed upon a receiving or check rack. The meter's size, number, index and address is carefully compared with the fitters' removal slip by the night clerk or checkers who designate that the meter has been "checked in" by placing two X chalk marks on the front panel of the meter. From the racks the meters are taken to the meter proving rooms where they are allowed to remain from twelve to twenty-four hours without removing the tube seals, in order to secure a temperature throughout the meter mechanism equivalent to that of the testing room.

After a gas meter has been once in service and has been subjected to the action of the gas, it is important to keep the tube caps securely closed on account of the unfavorable action of the atmosphere on the meter valves and diaphragms. The valves often carry a small amount of condensation on their surface, while the diaphragms will hold a certain amount of gas oil—both valves and diaphragms are therefore materially affected if exposed to the atmosphere.

Before testing the meter, the tester looks for the check marks on the front panel and if these are not visible the meter is set aside and the foreman's attention is called to the same. He then removes the tube seals and proceeds to test the meter with a device called a meter prover. The unit of measure for gas is a cubic foot, i. e., the volume occupied by 62.231 lb. of distilled water at a temperature of 62 deg. Fahr. and 30 in. barometer. As volumes of gas or air cannot be handled like water or solids, special means must be adopted to effect the measurement of the gas or air to be passed through a meter for testing purposes. This can be readily done by using the test measuring tank, or meter prover.

Necessity of Attention to Details

To arrive at accurate results in testing gas meters close attention must be given to a great many details. To merely connect a meter to the prover and pass a small quantity of air through it without strict regard to the following rules is simply an approximation, not a test. To test a meter accurately the prover must be mathematically correct, set level, duly counterpoised and adjusted so as to give uniform pressure from top to bottom during the movement of the bell in the tank. The water in the prover, the air in the bell and the meter to be tested must all have a temperature (suitable thermometers are attached to the prover) uniform with the air of the room in which the tests are made, and all of these temperatures must be kept uniform during the entire testing period. After filling the holder with air and making sure that all connections to the meter are tight, about 1½ cu. ft. of air is passed through the meter as a preliminary test. On this "run" the air is shut off when the pinion finger rests exactly on one of the divisions of the "proving head" (2 ft. test dial) of the meter. The prover tank is then re-filled and by means of an adjusting valve the pointer on the tank is set at the zero mark on the scale. The prover valve is then opened and when the index finger on the meter test dial has made one complete revolution showing that 2 cu. ft. of air had passed through the meter, the valve is instantly shut off. If the quantity registered by the meter corresponds exactly with that registered by the prover the meter is correct, but if more is registered by the prover than by the meter, the meter is slow—if less, the meter is fast. Meters are tested with an initial pressure of 1½ in. of water at the inlet pipe under two different speeds—one with a full open outlet, the other with a checked opening, restricting a five light meter (smaller and larger sizes in proportion) to a capacity of 30 cu. ft. per hour. The purpose of the two tests is to secure uniformity of proof for whatever speed the meter may meet in service. All test readings are made in duplicate, the original is sent to the office and the duplicate is attached to the meter. "OK," or the percentage of error under the two tests is marked on the meter with chalk, in order to indicate what adjustment might be necessary.

Test for Inside Leakage

Meters that test "OK" on this preliminary test and have been in service for less than two years are sent to the pilot test bench for the "pilot test" to insure against inside leakage. This test is made by connecting the inlet to the meter with a gas supply—a pilot burner is placed on the outlet, and after the gas is lighted it is turned down to a very small flame. With the meter

operating under this exceedingly small consumption, it is necessary to make sure that the meter will make a complete revolution of the tangent within a reasonable period (practice indicates the various periods for various size meters) of time. This rather severe test is made to detect a by-passage of gas from inside leakage, leaky diaphragms and valves or lost motion from wear to prevent the meter from operating and recording correctly. If the leakage is detected the meter is taken apart and inspected for the cause of the leakage.

All meters tested and found in error, or having been in service over two years, are sent to the "opening up room" where the top, back plate, back and front are removed for inspection. If the diaphragms pass inspection as to condition and leakage they are sent to the oiling table to be re-oiled. After this has been done the meter case is carefully cleaned out, the diaphragm is tested under pressure (3 to 6 in.), for leakage, the back and front plates of the meter are re-soldered on, and the meter is sent to the "fitting-up bench." At the "fitting-up bench" the packing is removed from the stuffing boxes, valve seats and valve covers are reground and tried for tightness, and the meter top is carefully washed out with gasoline. The stuffing boxes are then repacked and the back plate re-soldered before the meter is ready for pressure, pilot and proof tests.

Should the diaphragms fail to pass inspection, they, with the index, are removed, and the case is sent to the boiling out tank where all paint and foreign matter is removed by a caustic soda bath. It is a good policy to replace fittings into the same meter from which they have been removed. This is insured by placing all the small parts taken from a meter into a numbered canvas bag, the duplicate number of which is wired to the meter. A new diaphragm is then installed and the meter takes the same course as "the oiled meter."

Finally the meters are sent to the provers for adjustment as previously described, and after the adjustments have been made the top is soldered on and the meter is sent to a pressure test tank where it is submerged in a tank of water and subjected to a three pound air test for the purpose of locating any leaks that may exist in the outside case or top.

After the meter is painted it is sent back to the meter provers for final test by the State Gas Inspector who is under the jurisdiction of the Public Service Commission. After the meter passes the State Inspector he solders on a numbered brass seal, and also stamps the date of inspection in red sealing wax on the top. A careful record is made of each meter—date of inspection, maker's number, and the state seal number are all carefully recorded by the Inspector. The meter is then ready for service on the consumer's premises.

Increase in By-Product Oven Construction Not Due to Inflated Prices for By-Product

That the cause of the rapid increase in by-product oven construction has not been a desire to take advantage of the inflated prices for by-products due to war conditions, but a financial condition favoring large investments brought about by the war, and making it possible to carry forward plans made previously for such development when opportunity is presented, is pointed out by C. J. Ramsburg and F. W. Sperr, Jr., vice-president and chief chemist, respectively, of the H. Koppers Company, in a paper in the April *Journal* of the Franklin Institute.

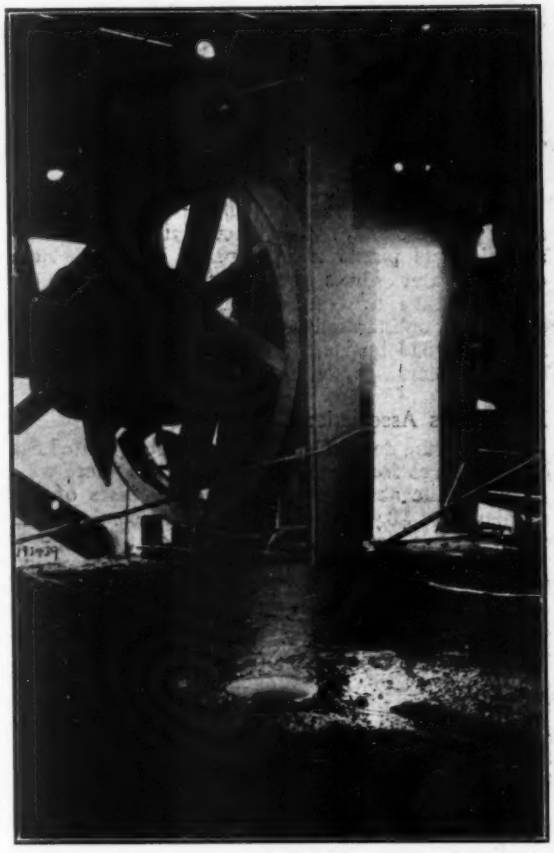


Photo by Underwood & Underwood.

FORCE OF ESCAPING GAS SO GREAT THAT SILVER DOLLAR WAS SENT SKYWARD LIKE A BULLET, GOING AS HIGH AS TOP OF DERRICK

Arkansas Well Discharges Twenty to Twenty-five Million Cubic Feet of Gas Per Hour

What has been declared to be the biggest natural gas well in the world is shown in the accompanying illustration discharging from 20,000,000 to 25,000,000 cu. ft. of gas just before being capped. This is located in the Kibler, Ark., gas fields. It was the first drilled by the Clear Creek Oil & Gas Company and is estimated at from 20,000,000 to 25,000,000 cu. ft. daily. A silver dollar thrown edge down into the mouth of the 10 in. hole is sent skyward like a bullet from a gun, going as high as the top of the derrick.

The force was so great that capping the well was a great undertaking, and three different caps were tried before one large enough was made to order and the well successfully capped. The hole is seen in the immediate foreground. From the opening in the earth the gas is rushing in great volume.

Price Paid for Coal by One Company 300 Per Cent. Higher than a Year Ago

The Greenville plant of the Southern Public Utilities Company has just closed a contract for gas coal at a price 300 per cent. higher than that paid a year ago, according to James McCabe, local manager.

Utility Business in Country Increases 137 Per Cent. in 10-Year Period

F. K. Shrader Declares That With Conditions as they Exist To-day There is Scant Reason to Expect Anything but a Continued Increase in the Cost of Capital the World Over

The Public Utility business in this country, including street and electric railways, central electric stations, artificial gas plants and telephone systems—but excluding water works properties for the reason that comprehensive figures are not available—comprise a business of substantially one-half the proportions of the steam railroad business, measured by invested capital and gross earnings, declared F. K. Shrader of Halsey, Stuart & Co., Chicago, Ill., in his paper read before the Illinois Gas Association March 21 and 22.

In 1912, the date of the latest available United States census figures for the country as a whole, there was invested in the above mentioned four classes of public utilities over $8,700,000,000, and their combined gross earnings that year were in excess of $1,345,000,000. The growth in public utilities has been truly remarkable, invested capital, exclusive of telephones for which figures at 1902 are not available, increasing in the ten-year period 1902-1912 from $3,239,000,000 to $7,688,000,000, an increase of 137%, gross earnings in the same period increased over $600,000,000, or 150%, and net earnings $243,000,000, or 165%. These figures indicate the scope of the public utility business and in a general way, convey some idea of the economic necessity of following sound financial procedure in conducting their operations. The investment banker and the public utility operator, charged with the responsibility of financing and conducting a business of the proportions indicated, may very properly devote some serious thought to the questions involved in sound public utility finance. With this idea in mind I have endeavored to set down here in a brief manner some of the fundamentals met with in financing a public utility corporation.

Consideration Affecting Security of Public Utility Bond

The many considerations affecting the security of a public utility bond may be classified under three main headings: Legal, Physical, and Economic or Business. I shall not attempt to discuss at any great length the legal and physical features, but rather will limit my remarks on these two subjects to a brief enumeration of some of the principal points involved.

Under Legal phases the following points would come up for consideration:

1. Is the corporation properly and legally organized with the necessary charter rights to engage in the business for which it is formed?

2. Does it possess the requisite franchise rights to enable it to freely and permanently conduct its business in the community it serves?

3. Are the titles to its property good and free from attack?

4. Are all its contracts and leases in valid form and do they impose any undue burdens upon the corporation?

5. Is the bond issue secured by a validly authorized and properly executed and recorded mortgage, incorporating proper provisions for safeguarding the interests of the bondholder, and establishing the desired lien on the assets of the corporation?

6. Are the bonds properly issued in compliance with the terms of the mortgage and any agreements supplemental thereto?

7. Is the corporation subject to the jurisdiction of a public service commission or analogous body, and if so, to what extent may the commission regulate the rates, service and security issues of the corporation?

Under Physical phases we should expect to have full and accurate knowledge on the following features:

1. Is the property economically constructed and so located as to most advantageously serve its community?

2. Is the equipment modern and of a character to adequately perform its functions?

3. What is the value of the property?

4. What is the physical condition of the property and what requirements must the corporation meet for its up-keep in the future; in other words, how, specifically, will the integrity of the investment be permanently maintained?

5. What is the productive capacity of the plant in relation to present and probable future demands for adequate service, and with what facility may the plant be extended to meet these demands?

6. What franchise or other legal obligations are imposed upon the corporation with reference to plant equipment or extensions?

Coming now to the Economic or Business phases, a field in which the investment banker is called upon to exercise the most unrelaxing care and mature judgment, we may briefly state as follows some of the more important considerations that must be analyzed and weighed in the selection of a sound public utility bond:

1. Community Served—Is it properous and growing and capable of supporting the service offered? Is the territory capable of development? What are the natural resources of the surrounding region? Are the industries of the community stable and firmly established? What facilities are present to induce growth in population?

2. Character of Business Done—Is it dependent in any considerable degree upon one or a few industries? Is it solely one class of utility, i. e., gas, electric, street railway, telephone, water, or is it a combination of two or more of these classes?

3. Earnings—What is the company's record of earnings over a period of years? Are they commensurate with the earnings of companies similarly situated? Do they produce an adequate, or excessive, return on the fair investment value of the property? Under what schedule of rates are they secured and are these rates fair?

4. Capitalization—What is the financial structure of the corporation? Is it properly balanced to provide for the issuance and sale of the requisite junior securities? Will it stand the test of years of depression?

5. Competition—What are the existing and potential

possibilities of competition? Is the company fully protected by law or ordinance in this respect?

6. Public Relations—What is the standing of the company and its officials in the community it serves?

7. Management—Is the conduct of the company's affairs in the hands of men of intelligence, integrity and responsibility? Are they fitted by past experience to successfully carry on the business?

Rate of Return

Having stated in general terms the broad aspects of the subject, let us now examine with some degree of particularity a few of the more pronounced fundamentals.

The financial results obtainable from utility operation under varying assumed controlling factors, viz., the rate of return allowed on the total investment, the unit of investment required to produce a unit of income, and certain imposed restrictions in the issuance of securities show rates of return of 6 per cent., 7 per cent. and 8 per cent.

With a rate of return of only 6 per cent. allowed the financial results obtained are apparently not sufficiently remunerative to permanently attract capital for the business under any of the assumed conditions of investment or issuance of securities. To permanently induce capital to enter the utility field a rate per cent. return for the stockholder of more than 4.17 per cent., 4.93 per cent., or even 5.54 per cent., must be shown. I believe you gentlemen, as public utility owners and operators, will agree that an indicated return for the stockholder of at least 10 per cent. must be obtainable to attract the junior money necessary for the permanent development of your properties, bearing in mind that some substantial part of the 10 per cent. must be retained in the business in the shape of reserves, surplus, etc. Under a 6 per cent. rate of return allowed on the total investment, to secure a 10 per cent. return for the stockholder it would be necessary, as shown in the following table, to sell 5 per cent. bonds, at par, to the extent of nearly 90 per cent. of the value of the property, assuming an investment of $6 for each $1 of gross revenue produced. Furthermore, under these conditions, the ratio of net earnings to bond interest would be only 1.40, and it would be necessary to operate and maintain the property for 64 per cent. of the gross revenue. Such financing is scarcely possible nowadays.

Investment	600
Gross	100
Operating	64
Net	36
Bond interest	26
Balance for stock	10
Per cent. on stock	10
Operating ratio	64
Par value bonds	520
Proceeds at 100	520
Balance from stock	80
Par value at 80	100

Statistics show that not until we reach an 8 per cent. return on the total investment is a return of 10 per cent. or more obtained for the stockholder, and even then if the investment equals or exceeds $5 per dollar of gross it becomes doubtful if the indicated results can be obtained, by reason of the necessarily low operating ratio. For instance, if the investment reaches $6, as no doubt it already does in the case of many gas companies, it becomes necessary to operate on a ratio of 52 per cent. to obtain 12 per cent. for the stockholder and surplus account. You are in a much better position than I to say if this is possible under to-day's conditions.

To my mind perhaps the most striking feature of these figures is the fact that as the investment rises the operating ratio must diminish very rapidly, and this holds true both under a constant rate of return and, even to a greater extent, as the rate of return grows larger. For instance, with an investment of $4 per unit of gross revenue a return of 6 per cent. can be realized with the property operated at 76 per cent., but for each additional dollar of investment it becomes necessary to reduce the operating ratio 6 per cent. to realize the same rate of return, viz., 6 per cent. To secure a return of 7 per cent. on the total investment each additional unit of investment calls for a reduction of 7 per cent. in operation, and under an 8 per cent. return a reduction of 8 per cent. in the operating ratio.

Rate of Interest

The cost of money is one of the most important, perhaps even the controlling, consideration in utility operation.

For instance, over 60 per cent. of all municipal bonds sold bore interest at the rate of 3½ per cent. or less and only slightly over 13 per cent. of the bonds sold bore 4½ per cent. or more. The condition in 1915 exhibits a remarkably different state of affairs, when only 0.01 per cent. of the sales bore 3½ per cent. or less, and over 71 per cent., or nearly three-fourths of the entire sales, were issued at rates of 4½ per cent. or more, a full 1 per cent. higher interest rate than in 1901.

These two illustrations show in a fairly definite manner what the tendency has been with respect to the cost of money in the past fifteen years. With conditions as they exist to-day there is scant reason to expect anything but a continued increase in the cost of capital the world over, and therefore, as indicated above, this is a factor of decided and growing importance to the public utility operator.

The two cardinal fundamentals of any investment are safety of principal and assurance of income. Safety of principal, aside from general credit considerations, depends in great measure upon the proportion of the loan to the value of the security offered. It is for this reason that one finds in a properly drawn mortgage a provision restricting the issuance of bonds from time to time as new property is added, only up to a certain percentage of the cost or value of such property, thus always maintaining an equity in the property over and above the bonds. The relative size of the equity thus created is determined by the percentage at which bonds are issued in relation to the cost of property. The difference between issuing bonds at 75 per cent. of cost and at 85 per cent. of cost does not sound large, but over a period of years, with bonds issued steadily, the difference, as a matter of fact, becomes quite material.

Assurance of income depends, of course, upon the ability of the corporation to promptly meet its interest obligations. With a view to safeguarding this feature it is customary to provide in the mortgage that no bonds may be issued by the corporation unless its net earnings for the preceding year are equal to a certain amount in excess of the annual interest requirements. The prescribed ratio of net earnings to interest requirements varies from 1 to 2, or over. Frequently also the issuance of bonds is conditioned upon gross earnings being equal to a certain number of times bond interest.

AMERICAN
GAS ENGINEERING JOURNAL

FIFTY-EIGHTH YEAR

Published Weekly by
AMERICAN GAS LIGHT JOURNAL, INC.
42 Pine Street, New York, N. Y.

ELBERT P. CALLENDER, President
STANTON G. KRAKE, Vice-President
FREDERICK A. SOUTHWORTH, Secy.-Treas.

EUGENE C. MILES, Editor

WESTERN MANAGER
E. B. FRITZ

CHICAGO OFFICE
537 So. Dearborn St.

Subscription $3.00 per year, including postage in the United States, Mexico, Cuba, Porto Rico, Hawaii or the Philippines.
In Canada, $4.00. Foreign, $5.00

Entered at the Post Office, New York City, as Second Class Matter.

CONTENTS

ATTENTION TO ARTISTIC DETAILS IN HANGING LAMPS AND TO CONVENIENCE OF CONSUMER ENABLES BROOKLYN COMPANY TO MAKE GREAT HEADWAY IN OUTDOOR LIGHTING.... 385
BENZOL MORE DURABLE THAN GASOLINE AS MOTOR FUEL WHEN USED STRAIGHT, AND ITS EFFECTIVENESS IS INCREASED WHEN MIXED WITH LATTER 387
GIVES RESULTS OBTAINED WITH 23 KINDS OF GAS COALS IN SEVEN TYPES OF CARBONIZATION PLANTS 388
DESCRIBES ROCHESTER COMPANY'S METHODS OF TESTING METERS 392
UTILITY BUSINESS IN COUNTRY INCREASES 137 PER CENT. IN 10-YEAR PERIOD 394
EDITORIALS 396
PUBLICATIONS 398
PATENTS PERTINENT TO GAS INDUSTRY 399
NEWS OF GAS INDUSTRY 401
SOCIETIES AND ASSOCIATIONS 407
PERSONALS 407
CONSTRUCTION NOTES 408
FINANCIAL NOTES WILL BE FOUND ON PAGE 16 OF THE ADVERTISING SECTION.

The Personal Touch in Publicity Work

A New York City firm—Best & Company—which deals in children's clothing, toys, etc., carries on publicity work with the personal touch in it to a very interesting degree. Somehow or other it manages to get the names and addresses of children of the ages its wares are adapted to, and such intimate details in regard to them as their ages, etc.

Shortly before Christmas, for instance, they sent a letter in a sealed envelope, with a two-cent stamp on it, to a boy about four years old, addressing him as one of America's future generals, and, as such, inviting him to visit their establishment to view their war horses. About four months later this boy had his fifth birthday. The day before the date there arrived another letter addressed to him telling what good wishes his many friends at Best's cherished toward him on this occasion and surmising that he would soon be leading his classes in school. Consequently they would always be pleased to have him drop in to tell them about his experiences.

There is reason to believe that this form of publicity is being found effective. In this particular boy's case it assuredly has been. A number of his Christmas presents were purchased as a result of the visit to view the war horses, and without a doubt other purchases will be made as a result of the birthday greeting. His mother had returned from making the final purchases for this latter event when the letter arrived, but so strong was its influence on her that she was keenly regretful that she had not made some of them at Best's. The publicity matter has a very flattering effect on the young people it is addressed to, and it creates a strong feeling of good will on the mother's part toward the establishment.

This is an example of carrying out publicity work with the personal touch in it to a very intimate degree. It is a means that is perfectly practical for gas company adaptation.

The gas company is very favorably situated in the matter of what might be termed getting an intimate knowledge of its customers' personalities. And human beings, after all, are very much alike.

Once the necessary details are tabulated or charted, the consumers could be divided into groups and suitable publicity matter devised for each. Thus it can be carried out with little greater expense than that which aims at the abstract. The results, however, would be vastly greater.

Encouraging Gardening Among Employees

As the needs of the nation, and those of the other nations whose interests are now ours, reveal themselves, the part the gas industry will of necessity bear in furthering the common cause attains a constantly increasing degree of importance.

We were already aware of the absolute need of

certain of the derivatives of coal distillation for the production of the high explosives necessary in the prosecution of modern warfare. We did not quite comprehend perhaps what immense quantities would be needed, but we were more or less prepared to meet the call.

We knew too that in our ammonia we furnished a source from which fertilizer could be made. We dimly sensed that increased quantities of this would be needed with the nation at war. But none of us even imagined what a great call for fertilizing material there was to be.

The country has learned that this is to be largely a war of food production, and it has responded enthusiastically to the call. People are plowing up their front yards to plant vegetables. Organized bodies such as the Boy Scouts are devoting themselves to developing the waste lands. Already the seed merchants are straining themselves to meet demands. Much of the land being converted is of the kind that requires considerable fertilizer. This is having its effect on the market.

Thus the gas industry carries a responsibility on both shoulders. It must provide in increased quantities the basis for munitions and at the same time for fertilizers. If it responds efficiently to both calls, one might consider that it has done its part. But the industy does not want to stop at merely doing its part. It wants to do everything it can.

Many companies have already done something towards encouraging their employees to take up vegetable gardening. All companies that can arrange to do so should take steps to follow their lead at once. Such efforts have become more than a feature of employees' welfare work. They have become a common duty.

There is an enhanced practical value to the gas company too. Before the war ends it is probable that Government needs may necessitate income taxation reaching down to very small salaries. In this case raising his own vegetables, and perhaps some for sale, would go a long way towards enabling the employee to shoulder his taxes and still be ahead on what he was getting for himself hitherto.

Total Damage by Gas-Caused Fires Less than a Fourth of that from those Caused by Smokers

" Considering the universality with which gas is used, the total of $937,714—the value of the fire loss in gas-caused fires, both manufactured and natural, throughout the country in 1915—is hardly a large one, although the best authorities consider that under proper conditions it might all be eliminated," declares Wilbur E. Mallalieu, general manager of the National Board of Fire Underwriters. " Most smokers," he further asserts, " would indignantly resent the charge that they are not ' good citizens,' but the burden of proof would seem to be on them in the light of figures which show a total fire loss of $4,505,963 attributable to their carelessness."

A still more striking contrast is that of gas-caused fires as against electrically-caused fires; the loss from the latter totalling $11,142,559 in value. Even the loss sustained from fires caused by petroleum and its products—$1,647,513—dwarfs the gas-caused fire loss in comparison.

These figures should indeed provide a source of encouragement, and at the same time an incentive to the gas industry. An encouragement because the gas man in general knows how the result was attained; through years of effort, research and painstaking educational work. One has but to glance through the proceedings of the various gas associations year by year to obtain a realization of how much thought and effort has been given to the elimination of hazard in the use of gas. The result is a man-wrought accomplishment, and it was the gas man who wrought it by his unceasing zeal.

They should be an incentive to us because all gas-caused fires are classed as strictly preventable. " The best authorities consider that fire loss from such a source may be eliminated entirely." We have thus before us the possibility of attaining a high goal—perfection in regard to fire hazard.

Contrast our situation with that of our electrical friends. Their fires are classed as partly preventable. Do what they can, with present-day equipment, they are faced constantly with the fact that sooner or later they will encounter a stone wall and can go no farther. From the present outlook at least they can never eliminate the fire hazard entirely in the use of their product.

With us it is simply a case of redoubled effort. A great dent would be made in this comparatively insignificant amount simply by the general adoption by gas companies—as now seems likely in the none too distant future—of free maintenance of consumers' lighting and gas-using appliances. The entrance to and the consequent familiarity with interior conditions in their patrons' houses that this system would give gas-company employees, would afford them a splendid opportunity to locate and point out defective conditions in the consumers' piping system and conduct their educational work to a more intensive degree than ever before.

There is also the opportunity to get down to fine points in perfecting our appliances; in making them fool-proof. Our ultimate aim should be to make it impossible for a consumer to set his premises on fire from gas, whether he is careless or not.

Such an aim unquestionably is impossible in complete attainment. But the fire hazard in the use of gas has been so minimized, apparently, that small results will have a proportionately big effect.

PUBLICATIONS

Technical Chemists' Handbook

Second edition, revised. Author, George Lunge, Ph.D.; pocket size; flexible back; 264 pages; illustrated. Published by D. Van Nostrand Company, 25 Park Place, New York, N. Y. Price $3.50 net.

Contains tables and methods of analysis for manufacturers of inorganic chemical products. Differs from first edition of same work in that all the analytical factors have been recalculated on the basis of the atomic weights published by the International Committee for 1916. The tables of specific gravities and other tables have been selected from among the most recent and reliable determinations.

Includes in special part sections on fuel and furnaces; manufacture of soda by the ammonia process; nitric acid manufacture; ammonia manufacture; manufacture of coal gas and preparation of standard solutions.

Standard Methods of Chemical Analysis

Author: Wilfred W. Scott in collaboration with H. A. Baker, L. C. Barton, F. G. Breyer, B. S. Clark, W. G. Derby, W. F. Doerflinger, D. K. French, H. A. Gardner, A. H. Gill, F. E. Hale, R. E. Hickman, W. B. Hicks, R. K. Mead, J. C. Olsen, R. S. Owens, W. L. Savell and J. A. Shaeffer. Cloth bound; 9 x 6 in.; 864 pages, illustrated. Publisher, D. Van Nostrand Company, 25 Park Place, New York, N. Y. Price $6 net.

A manual of analytical methods and general reference for the analytical chemist and for the advanced student. Includes chapters on "Cerium and Other Rare Earths," "Nitrogen," "Silicon," "Sulphur," "Thorium," "Acids," "Water Analysis," "Analysis of Paints," "Cements," "Gas Analysis" and "Tables and Useful Data."

A thorough and complete work. Its bulk however nullifies it for use as a ready reference in the gas plant. It has a place though in the company's library and the private library of the gas chemist.

Constitution and By-Laws—Membership List—Society of Gas Lighting

Flexible back; leather bound; 6½ x 4 in.; 41 pages. Issued by Society of Gas Lighting, 29 West Thirty-ninth Street, New York City. George G. Ramsdell, secretary.

Contains general information, constitution and by-laws of the society as well as the names of officers for 1917, past officers, finance committees, honorary members, life members and society and association affiliations of the various members. Farther on in the book are given chronological lists of the membership and the names and affiliations of deceased members. The new members added in 1916 are John B. Klumpp, inspecting engineer of the United Gas Improvement Company, and Albert M. Barnes, president and general manager of the Cambridge Gas Light Company.

An excellently gotten out and attractive book; one fully in keeping with the dignity and traditions of the society.

Growth of Baltimore Company's Gas Business in Last Five Years Equals Total Business Secured in Eighty Years Previous

Minimum Day's Demand Quadrupled While Peak Day Increases Two and One-Half Times—Maximum Day's Output in 1900, 6,944,000 Cu. Ft.; in 1916, 18,219,000 Cu. Ft.

In the five years ending with 1916, the growth alone in the gas business of the Consolidated Gas, Electric Light & Power Company of Baltimore was equal to the entire business of the company in 1900.

By aggressive and intensive new business methods, the company in the last five years has been able to add to its gas output a business that is equal to the entire business that had been built up in four-score years prior to 1900.

The following figures illustrate the growth in output since 1889:

For 1889 the output was 1,318,190,000 cu. ft.
For 1900 the output was 1,688,180,000 cu. ft.
For 1911 the output was 3,334,838,000 cu. ft.
For 1916 the output was 5,001,974,000 cu. ft.

The increase in the output in 1916, over 1911 was 1,667,136,000 cu. ft., which is practically equivalent to the output in 1900.

The significance of the growth lies in the fact that while increasing the output it has equalized the demand on the plant resulting in increasingly desirable operating conditions. The maximum day's output increased from 6,944,000 cu. ft. in 1900 to 18,219,000 cu. ft. in 1916; and the minimum day's output increased from 2,351,000 cu. ft. in 1900 to 10,012,000 cu. ft. in 1916. Thus while the maximum day's demand increased 162.0 per cent. the minimum day's demand has increased 325.0 per cent. While the peak day has increased over 2½ times, the minimum day has more than quadrupled.

Gas for Toy Making

Lead soldiers, which are riding on a wave of popularity just now, are largely indebted to gas for their creation, states *Gas Logic*. The most economical and speediest way to mobilize a large army of lead soldiers is to melt the metal in a soft metal furnace before pouring it into the tiny molds.

In the manufacture of mechanical toys, which are being made here in ever-increasing quantities, gas-fired ovens, gas-soldering irons, etc., are indispensable, while even the smallest toy establishment making wooden toys would find it well-nigh impossible to get along without the gas-fired glue pot.

Employees' Gardens a Good Investment

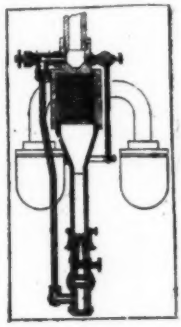
Business men find employees' gardens one of the best investments they can make. The one provided by the National Cash Register Company, of Dayton, Ohio, is yielding $2,000 a year to the boys in its employ from vegetables, and healthier, more industrious and more skillful workers to the company.—*The Nation's Business.*

Patents Pertinent to Gas Industry

Heated Tube Conveys Gas to Burners

Patent No. 1,212,621; described in Patent Office *Gazette*, 1-16-17, page 840. William Jesse Henry Fuller, Toronto, Ontario, Canada. Filed Sept. 22, 1915. Serial No. 52,124. Renewed June 12, 1916. Serial No. 103,342. (Cl. 67-50.)

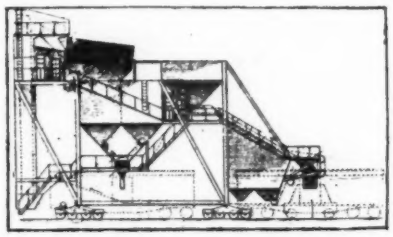
In the operation of these mantle burners gas passes from the receiving chamber through a pipe which runs downward and in close proximity to the burners. This pipe conveys the gas to the mixing tube, after which it passes into the mixing chamber and from thence to the burners. The gas becomes heated in its downward passage through the pipe, so that when it reaches the burners it is at the point of combustion. Likewise it is claimed that, in its passage through the heated pipe, any impurities that may have been in the gas have been removed and consequently a bright and efficient light is given. Pilot lights and a chain pull valve are also a portion of the equipment.



Burner Cock Provided with Means to Supply Gas to Main or Auxiliary Burner

Patent No. 1,212,510; described in Patent Office *Gazette*, 1-16-17, page 801. Max Kravitz, Philadelphia, Pa. Filed May 2, 1916. Serial No. 94,964. (Cl. 158-115.)

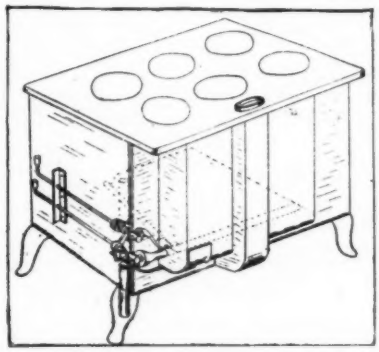
This gas stove is equipped with a main burner which surrounds an auxiliary burner. The burner cock is, as usual, provided with a horizontal passageway which conveys gas from the manifold to the mixing tube, but in addition it is also equipped with a vertical opening which connects another inlet passageway with the auxiliary burner tube. The valve passages are placed so that the valve may be moved in different positions to supply gas to either one of the burners.



Coal Handled by Portable Screening Rig

Patent No. 1,213,322; described in Patent Office *Gazette*, 1-23-17, page 1119. Charles S. Williamson, Chicago, Ill. Filed Nov. 3, 1911. Serial No. 658,301. (Cl. 83-56.)

In this portable coal screening plant a screen receives the coal from the receiving hopper. A spout conveys coal from the lower end of the screen, while an additional hopper receives the coal which has passed through the screen. An endless conveyor is provided for regulating the movement of the coal over the screen.



Coal Range to Gas by False Bottom

Patent No. 1,213,846; described in Patent Office *Gazette*, 1-30-17, page 1328. Ransom W. Davenport, Detroit, Mich., assignor to Detroit Stove Works, Detroit, Mich. Filed Jan. 24, 1916. Serial No. 74,003. (Cl. 126-36.)

In this combination coal and gas range, the oven has a bulge or projection in the rear wall in which the gas burner extends. Above the gas burner a false bottom may be inserted, a tube for lighting a pilot light being made as an integral part of this false bottom. A gas pilot burner coincides with this lighting tube when the false bottom is in position. Separate cocks control the gas supply to the main burner and the pilot, and an interlocking device is provided so that the main burner cock can not be opened before the pilot cock is turned on.

Lugs Prevent Gasket from Being Displaced

Patent No. 1,213,186; described in Patent Office *Gazette*, 1-23-17, page 1070. Joseph H. Glauber, deceased, Cleveland, Ohio, by the Citizens Savings & Trust Company, executor, Cleveland. Filed Mar. 29, 1915. Serial No. 17,899. (Cl. 137-73.)

The essential features of this saddle which is used for making service connections consist of lugs which are made as part of the gasket. These lugs project into recesses at the sides of the seat, and prevent the gasket from being displaced.

Position of Conveyor in Wagon Loader May Be Altered

Patent No. 1,212,396; described in Patent Office *Gazette*, 1-16-17, page 1760. Charles G. Pfeiffer and George W. Parker, Jr., Philadelphia, Pa. Filed Apr. 27, 1912. Serial No. 693,708. (Cl. 193-6.)

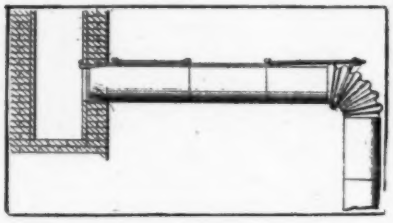
This wagon loader comprises a framework supported on wheels and carrying an endless bucket conveyor. Means are provided to vary the position of the lower end of the conveyor in relation to the ground.

Sulphate of Pitch and Oily Material Used for Binder in Briquette Making

Patent No. 1,212,291; described in Patent Office *Gazette*, 1-16-17, page 725. Felix A. Vogel, New York, N. Y., assignor to General Briquetting Company, New York, N. Y. Filed July 22, 1916. Serial No. 110,655. (Cl. 44-1.)

This method consists in heating an oily material to approximately 250 deg. Fahr. or over, then adding

thereto from time to time a concentrated solution of sulphate of pitch. The mixture is continuously agitated, and maintained at the original high temperature until the mixing is complete. The product thus produced is used to bind the finely divided fuel particles when these latter are formed into briquettes.



Method of Supporting Stove Pipes

Patent No. 1,214,105; described in Patent Office *Gazette*, 1-30-17, page 1417. Leonard P. Wirtz, Pilger, Saskatchewan, Canada. Filed Dec. 3, 1912. Serial No. 734,767. (Cl. 126-318.)

This method for supporting a stove pipe consists in securing a ring of heavy wire around a corrugated elbow and fastening this ring to the chimney breast by means of a series of links.

Process of Compressing, Purifying, Drying and Cooling Gases

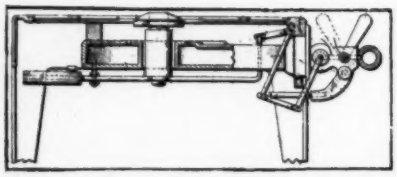
Patent No. 1,213,796; described in Patent Office *Gazette*, 1-23-17, page 1280. Willard Oliver Felt, Bradford, Pa., assignor to Petroleum Products Company. Filed Sept. 26, 1908. Serial No. 454,925. Renewed May 5, 1916. Serial No. 95,673. (Cl. 183-117.)

The process of purifying gases consists in refrigerating Turkey-red oil to a temperature considerably below that of the gas to be treated, commingling the oil and gas and then compressing the mixture.

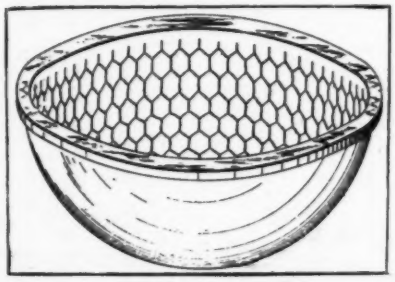
Gas in Range Automatically Turned On or Off

Patent No. 1,212,944; described in Patent Office *Gazette*, 1-16-17, page 952. Charles A. Hartmann, Washington, D. C. Filed Nov. 2, 1915. Serial No. 59,203. (Cl. 126-52.)

This device is arranged so that the gas supply to the burner may be turned on or cut off when a cooking utensil is placed upon and removed from the burner. Normally the post which projects through the center of the burner and the supporting lever



are in such position that the cap on the post extends beyond the grid, the gas supply to the burner being shut off. They are held in this position by means of the weight adjusted on the end of the lever. The pilot flame is a blue flame and is, of course, lighted, the height of the flame being adjusted to the desired height by means of a valve. When a cooking vessel is placed on the grid, it will engage the slightly projecting cap, forcing the latter downward, thus moving the supporting lever arm. Through the arrangement of links and levers this motion is transferred to the main valve which is opened, the pilot light igniting the gas. As long as the cooking utensil is over the burner, this condition will exist, but when it is removed, the counterweight forces the lever upward which in turn closes the gas valve. This device may be applied to an ordinary stove.



Inverted Bowl Reinforced by Wire Mesh

Patent No. 1,212,174; described in Patent Office *Gazette*, 1-16-17, page 680. John Beiswanger, Steubenville, Ohio, assignor to Gill Brothers Company, Steubenville. Filed Mar. 3, 1915. Serial No. 11,859. (Cl. 240-100.)

This bowl, to be used on an inverted fixture, is made of homogeneous glassware, and has a wire mesh embedded in the glass. This provides maximum strength without materially decreasing the capacity for transmitting light.

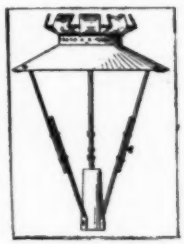
Coke Made from a Mixture of Breeze and Pitch

Patent No. 1,213,763; described in Patent Office *Gazette*, 1-23-17, page 1268. Clarence R. Eckert, Chicago, Ill., assignor to The Barrett Company, New York, N. Y. Filed Sept. 10, 1915. Serial No. 49,901. (Cl. 44-1.)

In the manufacture of coke from pitch and similar hydrocarbons, 10 per cent. of coke breeze and 90 per cent. of pitch are mixed, the mixture then being subjected to a coking operation.

Attachment Provided for Gas Burners

Patent No. 1,213,730; described in Patent Office *Gazette*, 1-23-17, page 1258. Pasquale John Boracci, Long Island City, N. Y. Filed June 13, 1916. Serial No. 103,493. (Cl. 126-252.)



This device is designed to fit over a gas bracket. It will provide a small amount of heat for the room and may be used for heating water and the like.

Method of Making Acetaldehyde

Patent No. 1,213,486; described in Patent Office *Gazette*, 1-23-17, page 1175. Harold Hibbert and Harold Arthur Morton, Pittsburgh, Pa., assignors to Union Carbide Company, New York, N. Y., a Corporation of Virginia. Filed Nov. 5, 1915. Serial No. 59,836. (Cl. 23-24.)

This method for making acetaldehyde consists in introducing acetylene gas into a solution of sulphuric acid, this solution also containing a salt of mercury and a borate, and distilling acetaldehyde from the solution.

The Process of Preparing Kieselguhr Filler

Patent No. 1,214,185; described in Patent Office *Gazette*, 1-30-17, page 1443. Arthur H. Krieger, Los Angeles, Cal., assignor to Kieselguhr Co., of America, Los Angeles, Cal. Filed May 13, 1915. Serial No. 27,836. Renewed Aug. 11, 1916. Serial No. 114,470. (Cl. 154-28.)

In forming heat insulating fillers in the shape of slabs or blocks, kieselguhr is compressed into a predetermined form to such a point that even on vibration it will not further compact. After this process, a wrapping is applied to hold the kieselguhr in the compressed form.

News of the Gas Industry

Relation of Gas Industry to Military Needs of the Nation Outstanding Feature of Pennsylvania Gas Association Convention

Pennsylvania Companies Pledge Themselves to Step that Should Do Much Towards Placing Gas for Lighting Favorably Before the Public—W. O. Lamson, Jr., Elected President for Ensuing Year

In the discussion on the paper of Capt. J. H. Burns on the relation of the gas industry to the military needs of the nation, W. H. Gartley emphasized the necessity of gas companies to consider the practical side. The Government, he declared, could make a vast expenditure to meet an emergency requirement without regard to future conditions or whether it was a good business proposition or not, but the gas industry does not have such leeway. The gas company management must look beyond the present and be reasonably assured of a market of sufficient magnitude or permanence to justify the investment in the equipment necessary.

Consolidation of Several Companies Sought

The Frost Gas Company, recently purchased by the H. L. Doherty Company, has applied to the public service commission for permission to acquire the property of the Alden-Batavia Natural Gas Company, the Akron Natural Gas Company, the Attica Natural Gas Company, the North Buffalo Natural Gas Company, the Ontario Gas Company and 4,342 shares of stock of the Niagara Light, Heat & Power Company of Tonawanda. A public hearing on the application is to be held in Buffalo shortly.

The H. L. Doherty Company has also absorbed the South Shore Natural Gas & Fuel Company of Dunkirk and a Silver Creek company.

Cincinnati Company to Train 500

W. W. Freeman, president of the Union Gas & Electric Company, told 500 employees at a patriotic meeting held in Cincinnati recently that the company directors will meet Monday to complete plans for military drills for all employees.

Dependents of those who enlist will be taken care of by the company.

P. Lincoln Mitchell, captain of Troop C, urged those who could not enlist to induce others to do so. Pictures of Troop C in action on the border were shown.

Albert Morrill, attorney, told of benefits derived at the training camp at Plattsburg, N. Y., and showed motion pictures of recruits being trained.

Pay Oil Does Not Reach as Far North as Lyon County, Kansas

Recent information received from Walter M. Russell, manager of the Emporia Gas Company, which operates in and about Emporia, Kansas, seems to indicate the northern extreme to which the paying oil territory extends.

During the last few months a number of companies have put down test holes in Lyon County ranging from 1,800 to 2,400 ft. in depth. The showing of oil has been found in two holes, but not in paying quantities; and there is no evidence of gas whatever. It is now generally conceded that the paying oil territory does not reach as far north as Lyon County, and there is little prospect of natural gas in this district.

Kitchen Equipment Exhibition at North Adams, Mass.

A complete hotel gas kitchen equipment was on exhibition at the salesroom of the North Adams (Mass.) Gas Light Company the latter part of March. A demonstration, to which hotel and boarding house keepers were invited, was held the 22d and 23d.

The equipment consisted of a Michigan Stove Company hotel range, a small broiler and cake griddle and a salamander for broiling large orders of steak.

A large number of interested people availed themselves of the opportunity to inspect this up-to-date outfit for efficient kitchen operation.

The meeting was called to order promptly at 10 o'clock April 11. An address of welcome was made by Mayor Filbert of Reading, and was responded to by L. R. Dutton, after which President F. P. Duggan delivered his annual address.

The first paper was read by W. A. Morris, chairman of the committee on Standardization of Gas Lighting Fixtures.

After the paper had been read and discussed by several of the members present, a resolution was introduced and unanimously adopted that the gas companies who are members of the Pennsylvania Gas Association should place on exhibition in their show rooms three sets of fixtures; one set that would meet the requirements of a small dwelling costing from $1,200 to $1,500—another set to meet the requirements of dwellings costing up to $3,500 and a third set for dwellings costing above $3,500. The association is to get out a pamphlet showing cuts of each of the sets to be placed in the hands of every salesman.

In the afternoon Captain James H. Burns, of the Ordnance Department of the U. S. Army delivered an address on the relation of the gas industry to the military needs of the Nation. The paper was thoroughly discussed by W. H. Gartley and J. B. Klumpp of the United Gas Improvement Company of Philadelphia, and A. E. Forstall of New York.

The attendance was about 100. Eight new members joined the association.

The officers elected for the coming year are W. O. Lamson, Jr., presi-

dent, Chester County Gas Company, West Chester, Pa.; W. R. Rhoades, first vice-president, Northern Central Gas Company, Williamsport, Pa.; George S. Speaker, 2d vice-president, Lebanon Gas & Fuel Company, Lebanon, Pa.; L. R. Dutton, secretary and treasurer, Philadelphia Suburban Gas & Electric Company, Wyncote, Pa.

The next annual meeting will be held in Philadelphia.

Other papers presented at the convention included "Recent Developments in High Pressure Gas Distribution," by Charles Wilde; "Accident Hazards in the Gas Industry and Their Prevention," by James B. Douglas; "An Analysis of Gas Advertising, Good and Bad," by A. B. Kelly; "How to Successfully Exploit Gas Lighting," by George Williams," and "Experiences in the Extension of Gas for Industrial Purposes," by W. A. Ehlers.

Commission Authorizes Indiana Increase

The Public Service Commission of Indiana has just handed down its decision in the rate-raising petition from the Consumers' Gas Company, of Princeton, Ind. The commission after reciting a peculiar set of circumstances surrounding this property, authorized the increasing of rates for both natural and artificial gas.

The new schedules of rates are to become effective May 20,1917. They are as follows:

For the first 5,000 cu. ft. or less of artificial gas (water gas) used in any one month, $1.25 per 1,000 cu. ft.; over 5,000 and under 10,000 cu. ft. in any one month, $1.15 per 1,000 cu. ft.; 10,000 cu. ft. and over of artificial gas used in any one month, $1 per 1,000 cu. ft.

For natural gas 50 cents per 1,000 cu. ft.

For mixed artificial and natural gas a proportionate sum to be determined by the proportionate parts of natural and artificial gas used in said mixture, the said proportionate amount to be determined by meter or analysis each day mixed gas is sold.

Minimum rate shall be $1 a month.

The order also provided that the gas company may require a deposit or solvent guarantee from each patron on metered service, "whenever after a prudent investigation, it shall reasonably believe that such deposit or guarantee is necessary to prevent loss or non-payment of bills by a patron. A deposit or guarantee shall not be required under any other condition. Such deposit is to be in the sum of $5. When either a deposit or a guarantee is required under this rule, the patron shall have the right to determine whether he will make a deposit or furnish a solvent guarantee. Interest at the rate of 5 per cent., per annum, payable annually, shall be paid on all deposits that remain with the company for six months or more. Should any depositor cease to be a patron, the Consumers Gas Company shall immediately refund the deposit and interest, less any unpaid bills." The order also allowed the gas company to charge $1 for each meter removed, where the service has not continued for a period of six months or longer.

Springfield Company Another to Pay Volunteers

Reimbursement of members of the Second Regiment called from their employment to bear arms presents a serious problem to business firms in Springfield and Western Massachussetts. When the guardsmen were called to the border last summer several firms enjoying unusual prosperity made good their wages, all or in part. Now with war a reality and with the plans for raising a huge army merely awaiting action by Congress, the situation presents a more serious aspect and the responsibility of such business firms is a subject of debate.

A representative of the Springfield Gas Light Company called on Col. Hayes recently to ask about the pay of soldiers. He said that the company intended to pay single men the difference between their army and regular pay and the married men full pay.

Manitowoc Company Grants Bonus with Wage Increase

A bonus system has been inaugurated by the Manitowoc Gas Company for employees of the company at its plant, ten men sharing in the plan.

The announcement by the new company was made in connection with the granting of an increase in wages to employees of the concern which became operative April 3, with the reorganization of the company by the new owners.

Under operation of the bonus system, employees of the company will receive a percentage bonus on wages at the expiration of stated terms of employment.

Manager Eastman said that the company had decided upon the new plan and at the same time has conceded the men an increase in their regular compensation.

Interests in Iowa Public Service Sold

A deal was consummated recently whereby D. C. Tenney, of Des Moines, Ia., takes over the Appleby-Wagner interests in the Iowa Public Service Company at Ames, Ia., and passes into control of the business.

Mr. Tenney, who has been a stockholder in the gas company since it was organized, is also president of the American Gas Construction Company of Newton, and will continue to live in Des Moines for the present, but expects eventually to make his home in Ames, when his sons have finished their college education and will become active in the business with him.

The Ames management will still rest with T. M. Hilton.

Gas Company Makes Friends by Free Service to Soldiers Guarding Ship Yard

The Newport News & Hampton Railway, Gas & Electric Company, Newport News, Va., of which W. F. Croston is superintendent of the gas department, has earned considerable commendation by its action in connecting up the cook tent of Battery D, 4th Virginia Artillery with gas, lending the soldiers a three-section hotel range and furnishing them with free gas to do the cooking. This battery is at the present time guarding the ship yard at Newport News. The gas company ran a special pipe line to make the service.

Another Association Pledges Support

The Gas Sales Association of New England dined at the Boston City Club recently and a telegram was sent to President Wilson offering the aid of the association and the gas industries of New England, which the association represents, in case of need.

Boston Company's Monthly Report

The gas output of the Boston Consolidated Gas Company for March was 520,717,000 cu. ft., an increase of 6.4 per cent. over the corresponding month a year ago.

Plans for Pacific Coast Gas Association Convention

The Pacific Coast Gas Association will hold its twenty-fifth annual convention at Santa Cruz, California, Sept. 18 to 21 inclusive this year.

The first exhibition of gas appliances held in connection with the convention at Long Beach, California, in 1914, was so successful, and the appliance section of the association has become each year so much more important, that a committee of appliance men were appointed by the association to arrange for an exhibit of gas appliances during the convention week at Santa Cruz. The committee having this in charge consists of the following members: B. S. Pedersen (Chairman), George M. Clark & Company, Div.; H. W. Jackson, James Graham Mfg. Company; R. L. Cardiff, Coast Counties Gas & Electric Company; L. C. Braun, Eclipse Stove Company; R. J. Thompson, Welsbach Company; Paul E. Haugh, Trenkamp Stove & Mfg. Company; T. Leary, H. Mueller Mfg. Company.

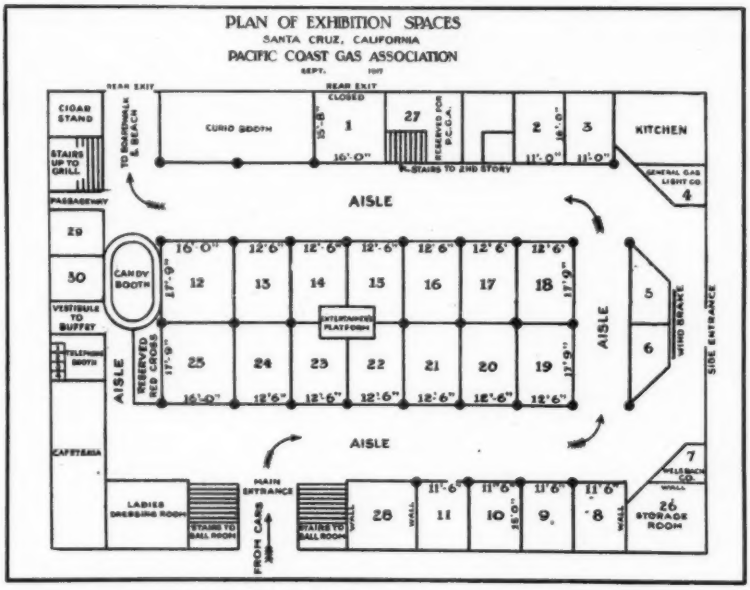
The committee has made arrangements for the holding of an exhibit of gas appliances at Santa Cruz, which it is expected will be better and more comprehensive than any heretofore had on the Pacific Coast.

The ground floor of the Casino will be available for the holding of this exhibition, giving ample room in one of the finest exhibition halls in the West with all the facilities for exhibiting goods that can possibly be had. The illustration herewith shows the arrangement of the spaces and aisles. From this it will be seen that it is necessary that every booth be passed by the public in going from the main entrance to the exit to the board walk and beach.

It is the purpose of the committee to have an exhibition of appliances not only for the benefit of the members of the gas association, but to give general publicity as well, the committee feeling that any publicity given to appliances will revert in benefit to the members of the association through their different gas companies.

Santa Cruz is a resort city and visited by thousands daily who enjoy the beautiful beach and other natural attractions. These visitors come from all districts of the state. The advertising advantages of an exhibit at Santa Cruz will be felt throughout the entire territory covered by the Pacific Coast Gas Association.

While the convention will only be in session four days, it is intended to continue the exhibit during the entire Convention Week.



EXHIBITION FLOOR OF CASINO AT SANTA CRUZ, CAL.

It is intended to have the exhibition goods shipped from San Francisco in pooled cars and delivered on the sidetrack adjacent to the exhibition hall where help will be furnished to unload, uncrate and place the exhibits, thereby eliminating cartage charges and minimizing breakage. Arrangements will be made to have the necessary fitters on the ground ready to connect all appliances. Free gas and water will be furnished and it is expected that all exhibits will be "live" ones. Services will be run free of charge to each booth.

Special editions of the daily papers with full page ads, each individual exhibitor being advertised, will be issued and at least three issues of each paper will be used. This will assure wide publicity to the convention and the gas appliance exhibit.

Entertainment features will be introduced that will assure full attendance at the exhibits afternoons and evenings. Exhibition baking and cooking contests will take place and prizes will be offered for these and other features to be put on by the committee. The baking and cooking will be under the auspices of the Domestic Science Department of the High Schools, the articles baked being turned over to the local Red Cross Society for disposal.

All exhibits may be offered for sale, the local and other gas companies having agreed to connect for the exhibitors any appliances that may be sold for use in Santa Cruz or outside cities. This feature will be advertised by the local gas company for some time prior to the opening of the convention.

The exhibit of appliances will be made on a mutual basis at actual cost to the exhibitors. Exhibitors will be limited to the number of spaces shown in the illustration and choice of spaces, will be given in the order in which reservations are received. All locations are deemed equally advantageous. A price of $30 for each space has been estimated as enabling the committee to pay all expenses, including decorations, publicity and entertainment.

Owing to the limited number of spaces available, the committee reserves the right to allot space, though they will follow the wishes of the exhibitors when possible.

Reservations should be made as soon as possible, accompanied by check for $30, made payable to B. S. Pedersen, Chairman Gas Exhibits Committee, P. C. G. A.

Advance in Oil Costs

A. A. Davis, superintendent of the Oro Electric Corporation, operating at Oroville Division, Cal., gives present cost of oil at his company, which is interesting from the standpoint of abnormal increases.

Gas-making oil now costs at that concern $1.76 per 42-gal. barrels, or 4 1/5 cents per gal. This, Mr. Davis states, is nearly 100 per cent. advance in two years.

May Use Gas Preparedness Float for Recruiting

That government officials are considering taking over the model battleship used by the Lawrence Gas Company in the preparedness parade held in Lawrence last year for recruiting purposes became known recently. It was learned that the recruiting corps from the Battleship Georgia, when making a visit here a short time ago, looked over the craft and decided to take the matter up with their superiors. The gas company will give the float to the government, ready to be mounted on a truck if the officials desire to use it.

This float attracted a great deal of attention and favorable comment was expressed when it captured one of the prizes in the preparedness parade. It was suggested that it would be a striking advertisement for use in the recruiting work of the navy.

New York and Richmond Asks Bond Issue

The Public Service Commission of New York has reserved decision on the application of the New York and Richmond Gas Company for approval of an issue of $2,214,400 worth of bonds.

The company asked authority to execute its first refunding mortgage to the Central Trust Company of New York as trustee and to issue the amount of bonds stated, payable thirty years after their date. The proceeds are to be applied to reimburse expenditures out of income for improvements, to refund outstanding bonds secured by its 5 per cent. mortgage, $1,500,000; for additions for the year 1917, $190,000, and the balance for discount and expense owing to the bonds being sold at 90.

The company stated that its franchise to operate had been accidentally destroyed, but that the Supreme Court had recognized its right to maintain and operate such franchise.

The existing plant is valued at $3,305,223.

Rate Increase in Fayette County, Pa.

On and after April 26 the Fayette County Gas Company will raise its domestic rate 5 cents a thousand feet. It has posted notices and filed with the Pennsylvania Public Service Commission a supplement to the rate and tariff schedule. The new domestic rate is to be 35 cents a thousand feet, with the usual discount of 2½ cents a thousand if paid by the tenth of the month. The present rate is 30 cents a thousand, with a discount of 2½ cents. The company supplies the towns of Uniontown, Connellsville, New Haven, Dunbar, Dawson, Scottdale and Mount Pleasant, Pa.

The high cost of labor and materials and the shortage of gas which has caused the company to go farther and farther away to tap new fields, until now its lines are extended well into the West Virginia field, is the reason for the advance in the rate.

In order to instruct the consumer in the conservation of gas, the company has prepared a booklet, "General Instruction and Information Upon the Use of Gas in the Home," which is being mailed to each person on the list of subscribers. The book is by experts, and it is believed that if the instructions are followed the consumption will be sufficiently reduced to save at least the necessary increase in price.

Street Lighting Contract for Fall River Awarded

Mayor Kay, Supt. of Streets Manning and A. M. Brown, district manager of the Welsbach Street Lighting Company of America, were present at the meeting held recently in Fall River, Mass. All of the members of the committee were also on hand. Alderman Edmondson, chairman of the committee, in opening the meeting, stated that he had asked for a statement from the street department as to what it had cost the city for caring for the gas lighting system last year and he submitted the same, which contained the following facts:

Gas, $4,635.94; labor, $6,453.20; matches, $34.50; mantles, $229.25; changes and repairs, $36.80; domes and ventilators, $239.80; wood alcohol, $8.50; chimneys, $122.50; freight and express, $50.95; total, $11,811.44; average cost per light per year, $26.55.

Patrick Fay, secretary of the Lamplighters' Association, submitted some figures on a basis of 430 lights to show the average cost of the lights. One set of his figures showed the cost per light per year as follows: Labor, $12.85; gas, $10.50; mantles and other supplies, $1.20; average cost per light per year, $24.55. A second set of figures had $12.30 for labor, $10.50 for gas, and $1.20 for mantles and other supplies, and brought the average cost per light per year down to $24 per annum.

After talking the matter over at some length a motion was made and seconded that the proposition of the lamplighters be accepted. This was voted down by six to three. A motion was then made and seconded that the proposition of the Welsbach Street Lighting Company of America be accepted and this was carried by a vote of six to three.

The order which the above vote will recommend, reads as follows:

"That the mayor be authorized to execute a contract for and in behalf of the city with the Welsbach Street Lighting Company of America to take over the gas lights now maintained, or that may hereafter be ordered by the city, for a term of five years at a price of $24.10 per lamp per year for a term of five years, the lights to burn on an all-night schedule every night in the year, from dusk to dawn, the cost of $24.10 to include gas, mantles, repairs, and all labor necessary to keep the lamps in proper repair. Also to light, extinguish and clean them and to connect the same free of all expense to the city.

The company is to agree to furnish street corner signs of ruby letters on ground glass segment for all lamps now located on street corners or which may hereafter be ordered and installed on street corners. The company also agrees to furnish and connect without expense to the city lamps at any new location that may be ordered by the city."

Besides assuring the city of better cared for lamps, it is also figured that there will be a saving of about $5,000 on the five-year contract on the present number of lights, 430.

$2,000,000 Arkansas Corporation Gets Charter

The largest filing fee for domestic corporations which has been received during T. J. Terral's administration as secretary of state, was paid recently when the Arkansas Public Service Company of Pine Bluff, a $2,000,000 corporation, filed a check of $2,020 with its articles of incorporation. The company proposes to engage in "one or more or any or all" of the following projects: The manufacture and distribution of electricity for light, heat and power; artificial gas manufacturing and distribution; oil and natural gas development and the maintenance of pipe lines, water pumping and distributing systems; the construc-

tion of hydro-electric plants and power sites, and the transmission of electricity by distribution lines and natural and artificial gas by pipe lines.

The officers are: A. Brewster, president; Garland Brewster, vice-president; M. Danaher, secretary, and C. C. Brewster, treasurer. Of the authorized capital, $1,000 is paid in. The charter of the company allows it to engage in practically all public services with the exception of railroads. It is specifically limited to the control, operation, etc., of street railroads and its powers are good anywhere within the State of Arkansas.

Large Display Room for Massachusetts Company

The Newburyport (Mass.) Gas & Electric Company is making important changes in its office on Pleasant Street in order to provide a greater opportunity to display the many electric and gas appliances which it is in a position to furnish at low prices. The company is convinced that it is only necessary for the people to know about these appliances, to realize the great conveniences available at remarkably low cost, in order to make them want to have them in their houses.

To obtain room for their enlarged display department, the accounting department is to be moved to the rear of the office, where it will have desirable quiet and be out of sight of the people entering and leaving the building. A large window will be placed in the Green Street side of the building to give good light, and a glass partition with door will shut off the room from the private office of Superintendent Spaulding.

A cage for the cashier will be provided in one corner of the space now occupied by the accounting department and to reach it patrons will traverse the length of the display room so that the various offerings will be noted by the observant.

The large space thus made available to the display end of the company's business will be utilized to the best possible advantage. Gas and electric devices of all kinds and descriptions will be installed and demonstrated by competent employees of the company. Mr. Kidder, who has been office manager, has been advanced to the position of business manager, and it will be his duty to push the sale of gas and electrical appliances, which of course will mean an increase in the consumption of gas and electricity. He will have necessary assistance. Among other things that will be shown will be gas hot water heaters, gas stoves, electric lights, electric irons, electric toasters, washing machines, sewing machines, a long array of novelties, etc. There will be meters showing the cost of having the various devices in cents instead of feet, which, it is figured, will be illuminating to the public.

Bill to Reduce Service Commission Killed

The special committee on commissions of the Massachusetts Legislature voted recently to report adversely on the bill which was described in the AMERICAN GAS ENGINEERING JOURNAL Jan. 8, to reorganize the public service commission by reducing its membership, and to report reference to the next Legislature on the bill filed by Representative Allen of Newton to consolidate the public service and gas and electric commissions.

The committee on public service reported reference to the next Legislature in the Senate on bills to increase the salaries of the civil service commissioners, and to place county employees of the state treasurer and state saving bank commission and employees of city clerks, treasurers and tax collectors under civil service rules and regulations.

Commission to Help Gas Companies

The Public Service Commission of New Hampshire has issued an order effective April 1, permitting the gas utilities in the state to manufacture gas of a heating value averaging not less than 565 B.t.u per cubic foot. This order is supplementary to an order which went into effect on July 1, 1915, and fixed the minimum heating value of gas produced at not less than 600 B.t.u. per cubic foot. The supplementary order was issued by the commission after investigation, to meet the existing abnormal price of commodities entering into the cost of producing gas. The new order is merely a temporary one, it being the intention of the commission to replace the original order prescribing a standard for gas of not less than 600 B.t.u. per cubic foot as soon as market conditions return to normal.

Company Employees Get Business Course Diplomas

In the assembly room of the New Haven (Conn.) Gas Light Company a very interesting meeting took place recently when the members who had taken the course in the Sheldon School, "Science of Business Efficiency," received their diplomas. The class had held its session for a year, following the business course which had been taken by a similar class during the previous year. The president of the class, Charles B. Chatfield, opened the meeting with all of the graduating members present except one, besides more than 20 employees of the company who had received their diplomas a year ago. Philmer Eves, who was president of the graduate class of last year, gave an address on the importance of cultivating the positive qualities of the mind and eliminating the negative influence as an indispensable aid in rendering true service to the gas company's patrons. All of the 30 students successfully passed their examinations, a very creditable showing. F. R. Benjamin, the New England manager of the Sheldon school, commended the class for its excellent work and congratulated the members on the fact that 100 per cent. of the members were entitled to the honor of the diploma. These diplomas he then presented, offering a word of congratulation and encouragement to each recipient. J. Arnold Norcross, treasurer of the company, reviewed the fundamental lessons which had been studied and learned by those who had taken this business course, showing the immense value to the employees themselves, as well as to their employers and the public of the "Science of Service." He presented each of the graduates with a check, representing one-half of the tuition fees which they had paid during the year. The gas company bore half the cost of this educational work, in the belief that the valuable results secured would increase efficiency in all departments.

Indiana Company Increases Dividend

The Citizens Gas & Fuel Company, of Terre Haute, Ind., through John T. Beasley, its attorney, has filed notice with the secretary of state of Indiana that it has changed the par value of its common stock from $50 a share to $100 a share and that it has increased the dividend on its preferred stock from 6 per cent., to 7 per cent.

Co-Operative Suggestions for Gas Range Week by N. C. G. A.

The recent booklet and material issued by the N. C. G. A. on "Suggestions to Gas Companies of Plans and Features for National Gas Range Week, May 7-12, 1917" should certainly be of great usefulness in creating big sales during the Special Range week.

The suggested window display has been carefully worked out and is planned for the best results.

An attractive Gas Range Sticker is offered and several newspaper advertisements and reading notices have been prepared by the association's publicity men.

Co-operative advertising of the range manufacturers is assured, and nothing is being left undone toward making it the biggest and most successful National Week.

Medina Gas and Fuel Company Moves Its Main Offices

The main offices of the Medina Gas & Fuel Company, a centralization of district offices now located at Medina, Ashland, Mansfield and Cleveland, are located since April 1 in the rooms on the third floor of the Citizens National Bank, having just closed a long-time lease for these rooms.

Harry Hull, field superintendent of the Medina Fuel & Gas Company of Ashland, and Secretary and Treasurer Brooks, who has been in charge of the offices at Mansfield, will have general charge of the offices here. From ten to fifteen families of men who are accountants, geologists and chemists, will remove to Wooster immediately. Within one year officers of the company estimate that families of fully fifty field men of the company will be residing in Wooster.

Large Well Struck in Kansas

The Sentinel Oil & Gas Company recently brought in one of the biggest gas wells ever drilled in the surrounding country, gauging a daily flow of 2,300,000 cu. ft. on the Hughes farm in Cutler township, one mile and a half south of Rantoul. It is 713 ft. deep; 12 ft. of sand was developed. The Sentinel Company, an H. L. Doherty subsidiary, has thirty gas wells supplying Paola and Osawatomie, besides selling gas to the Kansas Natural at Ottawa.

Gas Holder Collapses

After thirty-six years of constant service, the oldest holder at the gas works of the Atlanta Gas Light Company "ripped a seam" and collapsed, March 3, wasting about $100 worth of gas and upsetting the routine of the works for a time.

The accident is believed to have been due to some defect occasioned by the age of the holder—probably a hang or a catch between the two lifts that fastened them together and put undue strain on the riveted seam around the top.

The capacity of the holder was 480,000 cu. ft. Originally it was used for distribution, but long ago it became inadequate for that purpose and of recent years had been utilized as a relief. As soon as the extent of the injury can be determined, steps will be taken either to rebuild the holder or substitute new equipment.

Coke as Fuel Recognized in Denver

The Denver public is rapidly learning the value of coke as fuel as is indicated by the disposal of over 50,000 tons during the 12 months ended April 1, 1917. This was accomplished through educational work by the coke department of the Denver Gas & Electric Light Company, operated by Henry L. Doherty & Company chiefly along the lines of teaching its utilization for domestic use.

The gas output of the Denver Company has shown a steady increase yearly, and the coke "make" has been growing to such proportions as to cause some alarm. Under W. E. Malone's guidance the coke department set itself to the task of disposing of the entire "make" and so well has it succeeded that instead of the daily "make" of 110 tons being added to a pile, it is being loaded into bins and chutes for immediate delivery to customers.

One of the interesting features in the sale of this coke is that of this huge tonnage only 12,000 tons were taken by dealers, the remainder being sold direct to domestic trade. This condition was brought about largely through allowing a premium of 50 cents a ton for coke purchased during summer months, and as a result over 15,000 tons of the fuel were stored in cellars last summer.

As an indication of the important role assumed by the coke department, sales amounted to 27,000 tons for the year ending April 1, 1909, with an accumulation of 32,000 tons. Two years later sales amounted to 43,000 tons. Up to January 1, 1917, sales exceeded 34,000 tons, with expectations that by April 1, 49,000 tons would be disposed of. The exact tonnage sold was 50,567 which exceeded all former coke sales for a like period. The prospects for the coming year are such that the Denver company anticipates the entire yearly "make" being disposed of, and from arrangements completed the company is assured a higher price for its product.

A new coke conveyor was recently installed which will increase the facilities for caring for the outgoing supply, and decrease the amount of handling. It will also utilize space that has been unused for storage and also increase the salability of the coke by making it clean and dry.

Pennsylvania Towns Protest at Increase

Almost all of northwestern Pennsylvania is opposing the Pennsylvania Gas Company's 5 cent raise in the price of gas. The jump from 30 to 35 cents net a thousand is to become effective on the gas bills for May.

Chambers of Commerce, boards of trade, borough councils and other municipal and civic organizations are being urged to send a representation to Harrisburg to fight the increase when the public service hearings are held. All the people seem to feel that the company is entitled to perhaps 1 or 2 cents more but object to five cents.

At a meeting of the Central Trades Council of Uniontown, Pa., it was decided that the labor unions of this city will file a protest with the Public Service Commission against the 18 per cent. increase in domestic rates announced a short time ago by the Fayette County Gas Company. Petitions have been circulated and these show that more than 1,000 signatures had been obtained. Harry W. Byrne who filed a complaint against the gas company about two years ago to have the $10 deposit for domestic consumers abolished has been retained by the labor men to fight their cause in this new litigation.

The increase, effective April 26, will raise the rates to 35 cents per 1,000 cu. ft with a discount of two and one-half per cent. per 1,000 for prompt payment. The old rate was 30 cents with the same discount.

Commission Recognizes Oil Costs

Discussing a few of the problems the smaller gas companies are facing, the Public Service Commission of Indiana said:

"The evidence shows that during 1916 the petitioner (the Liberty Gas Light & Fuel Company) paid 4.9 cents per gallon for oil used in the manufacture of gas, and that it paid for oil during said year $1,323. The evidence further shows that the price of such oil is now 9.4 cents per gallon, or almost double the price of 1916. Petitioner's witnesses testified that the oil company supplying such oil heretofore refused to enter into a contract to furnish oil at the latter price. Petitioner also claims that its coal and coke will cost much more in the future than in 1916."

The commission authorized a schedule of rates for the company grading from $1.25 per 1,000 cu. ft., to $1 per 1,000 cu. ft., with a minimum monthly charge of 75 cents.

Minimum Charge Explained to Providence Board

The Providence Gas Company last year added $4,701.43 to its receipts by means of its "minimum charge" of 50 cents per month for the use of its meters, where gas was not used, according to figures sent to the Board of Aldermen of Providence, R. I., by Public Service Engineer Brunet.

Mr. Brunet's report was made in response to a request for the information by the board some time ago. The report explained that in cases where the charge had been made, and $6 worth of gas was finally used before the end of the year, a rebate of the charge to the customer was allowed.

The number of people affected by the minimum charge was not stated in the report, the company having informed Mr. Brunet that this would entail a large amount of work and time. The report was received by the aldermen.

Societies and Associations

THE ILLUMINATING ENGINEERING SOCIETY, Chicago Section, held their monthly meeting April 20, in the Edison Building, 125 South Clark Street, Room 1643, at 6:45 p. m. S. G. Hibben, illuminating engineer of the Westinghouse Lamp Company, who is an authority on office lighting, spoke on this subject, giving illustrations.

THE ILLUMINATING ENGINEERING SOCIETY, NEW YORK SECTION, held their monthly meeting in the Engineering Building, 29 West Thirty-ninth Street, New York City, April 12, at 8 p. m. During the course of the meeting the following papers were read and discussed: "Evolution of Light Projection," by C. A. B. Halvorson and R. B. Hussey, of the General Electric Company, Lynn, Mass.; "Development of a Permanent Street Lighting Plant for a Small City and Village," by R. B. Thompson, of the Central Hudson Gas & Electric Company, Newburgh, N. Y. After the technical meeting the entertainment committee arranged for the following informal talks: "Some Reminiscences of the Local Lighting Field," by William D. Kelley, general superintendent, department of meters, Consolidated Gas Company, New York; "Some Characteristic Curves," illustrated, by William J. Clark, vice-president of the Westchester Light Company, Mount Vernon, N. Y. The regular informal dinner was served at the Forty-second Street Restaurant, Forty-second Street and Madison Avenue, at 6.15 p. m.

Personal Notes

JOHN J. GARRISON vice-president of Rathbone, Sard & Company, Albany, N. Y., has resigned, resignation to take effect May 1. Mr. Garrison was in charge of the gas division of the above concern, which included the Aurora, Ill., plant as well as Albany, N. Y. He will remove to Detroit, where he will engage in building and real estate operations. Charles J. Breen, who has been special Eastern representative of the above concern for the past five years, has also resigned, to take effect the same day.

W. K. EAVENSON has recently severed his connection with the New York Consolidated Gas Company to accept a position as sales manager of the Surface Combustion Company, 15-21 Wilbur Avenue, Long Island City, N. Y. Mr. Eavenson has specialized in industrial fuel applications and his wide experience gained through twenty years of close connection with this end of the gas business makes him particularly adaptable to his new opening. Having started in the meter repair shop of the United Gas Improvement Company in 1898 Mr. Eavenson spent a little over eleven years in this company's various departments, working for a considerable

W. K. EAVENSON

time under William J. Serrill, engineer of distribution. In 1909 he went with the Consolidated Gas Company of New York in charge of the industrial work in Manhattan, and at the time of his resignation he was the head of the Industrial Division. Some time ago he went through the course of the Practical Class established by the American Gas Institute. He is a member of the Institute as well as the National Commercial Gas Association.

JAMES A. DOHERTY, who has been connected with the Woodstock Gas Light Company, Ontario, Canada, for the past three and a half years, has recently resigned and returned to his home in Cincinnati for a short vacation, after which he will be assigned to some other company of the Doherty Organization.

GEORGE A. BURRELL of Pittsburgh, Pa., has accepted the position of mobilizing the nation's technical forces in the fight against the enemy's poisoned gases. The place carries with it a commission as major in the Army. Mr. Burrell, who is an authority on gases, was formerly connected with the Bureau of Mines, which position he left

last October, and since then has had a private practice as consulting engineer with headquarters in the Benedum-Trees Building. He is also chairman of the Pittsburgh section of the American Chemical Society.

L. D. SPRAGLE has been appointed general manager of the Citizens Gas Light Company of Jackson, Tenn., and has assumed control of the company's affairs. Mr. Spragle has had considerable experience in the gas industry, having been manager of several plants operated by the United Gas Improvement Company of Philadelphia. W. H. Biggs, formerly manager will remain with the company in a business capacity.

THE WESTMORELAND COAL COMPANY of Phila., Pa., at the recent annual meeting of the stockholders re-elected the retiring directors.

Construction Notes

Maine Town Adverse to Building Gas Plant

A committee of citizens of the town of Sanford, Me., has reported that in its opinion the town should not undertake the construction of a gas plant at present, despite the desirability of gas service in the town and the probability that a gas plant, properly managed, would pay.

The committee consulted several New York and Boston gas construction companies, besides the managers and officers of the plants at Norwood, Ipswich, North Attleboro, and Amesbury, Mass., and Rochester, N. H., and Calais, Me. These places were selected because comparable in size and conditions with the town of Sanford.

On the question, "Does the town need a gas plant?" the committee says that there is no public utility so much needed as gas for lighting, cooking, heating and manufacturing purposes. The town now has electric service, but the committee recognizes that the large working population should be supplied with gas as a cheaper form of illuminant and for cooking and heating. Even in Maine gas would be more economical than wood for fuel.

The reasons ascribed for the committee's decision not to recommend construction are the high cost of labor, building material, coal and oil, and the uncertainty of good business management for the enterprise.

To Lay 10-inch Feeder Main at Newport News

The Newport News & Hampton Railway, Gas & Electric Company, of which W. F. Croston is superintendent of the gas department, will shortly start work on laying a 10-in. feeder main for the betterment of supply in the north end of Newport News, Va.

May Extend Webster, Mass., Line

Representatives of the Webster & Southbridge Gas & Electric Company have been at work for a few days in Oxford making a canvass of people who would be customers of the company provided the gas service of the company was extended to include that town. The company has had this move under contemplation for some time. Should the canvas warrant, the line will be extended early this summer.

The construction gang of the company is at work at present connecting the towns of Webster and Southbridge with a pipe line. The work was started last fall and will not be finished for some time to come. The pipe line is being laid with a view of better serving the people of both towns.

Improvements at Municipal Works, Alexandria, Va.

A considerable number of improvements are being made and much new machinery is now being installed at the Alexandria Gas Works at Alexandria, Va.

Work has been begun on a new retort house 56 ft. 6 in. x 59 ft., built of brick on concrete foundation, with an 8 ft. cellar, concrete floor in front of benches, and the roof is to be of corrugated asbestos on a steel framing.

In the new house will be installed eight ¾-depth benches of sixes, stop-end horizontals; these benches will be in stacks of four each, back to back, and the contract work has been awarded to the James Gardner, Jr., Company of Bolivar, Pa.

The iron work is to be done by the Western Gas Construction Company of Fort Wayne, Ind., while the asbestos roofing is to be supplied by the Keesby & Mattison Company of Ambler, Pa.

A local firm, the Alexandria Iron Works, will furnish the steel framing for the roofing.

A. W. Latham, superintendent of the City Gas Department, to whom we are indebted for this information, declared that after the new house is finished and their scrubbing and condensing apparatus is rearranged, they will have one of the most complete, up-to-date plants of its kind in the South.

He speaks very favorably of the gentlemen on the committee who, being all good, safe business men, have made it possible for him to make these improvements without having to call on the City Government for an appropriation, which is generally the case in municipal plants.

Empire Pipe Line Progresses

The Empire Pipe Line Company, a City Service subsidiary, reports that its eight-inch line under construction between the Augusta, Kan., field and the nearest refinery of the Empire Refining Company group at Ponca City, Okla., is about half completed, and unless delays in pipe line shipments occur, the line should be finished by the middle of next month. The distance is about sixty-two miles. The Ponca City refinery and the Cushing refinery, another unit of the group, are already interconnected by a four-inch line.

Southern Companies Plan Improvements

Improvements and extensions in the equipment of the Atlanta (Ga.) Gas Light Company, planned for 1917 and subject to conditions, amount to a total probable investment of slightly over $100,000.

Portions of this total chargeable to new business are $36,000 for main extensions, $15,000 for service connections, and $17,000 for new meters —all in Atlanta only.

Similar figures relating to the new system about to be put in commission for service to College Park and East Point, Ga., aggregate $11,000.

In Decatur, some $15,000 will probably be invested in new equipment and extensions by the Suburban Gas & Electric Company.

Other Atlanta Gas items are $7,700 to be spent at the works for "boosters" to operate the new high-pressure system to East Point and College Park; and about $5,000 for a new tar-distilling plant.

Total probable expenditures by the Atlanta and the Decatur companies aggregate about $120,000.